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TRANSACTIONS

OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1912

PART I

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND TWELVE

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

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Massachusetts Horticultural Society.

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AUG 1 1914

Massachusetts Horticultural Society.

1912.

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

Edward B. Wilder, *Chairman*
Robert Cameron
John K. M. L. Farquhar
} *Committee on Lectures and Publications.*

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THE INAUGURAL MEETING, JANUARY 6, 1912.

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1912, PART I.

INAUGURAL MEETING.

The Inaugural Meeting of the Massachusetts Horticultural Society for the year 1912, as required by the By-laws, was held at Horticultural Hall, Boston, on Saturday, January 6, at twelve o'clock noon, with Vice-President Hunnewell in the chair.

The reports of the officers of the Society and of the chairmen of the various committees were presented as follow:

Report of the Board of Trustees, by the Secretary.

Report of the Treasurer, Walter Hunnewell.

Report of the Delegate to the State Board of Agriculture, Wilfrid Wheeler.

Report of the Secretary and Librarian.

Report of the Committee on Prizes and Exhibitions, John A. Pettigrew, Chairman.

Report of the Committee on Plants and Flowers, T. D. Hatfield, Chairman.

Report of the Committee on Fruits, Edward B. Wilder, Chairman.

Report of the Committee on Vegetables, Duncan Finlayson, Chairman.

Report of the Committee on Gardens, Charles W. Parker, Chairman.

Report of the Committee on Lectures, Edward B. Wilder, Chairman.

In connection with the Treasurer's report it was voted, on motion of Mr. Ufford, to recommend to the Board of Trustees that the expense of insurance be spread over the five years for which the policies are usually written instead of charging the full amount to the year in which they fall due.

On motion of Mr. Wheeler, it was voted to accept the various reports presented and to order their publication in the annual Transactions of the Society.

The meeting was then dissolved.

William P. Rich,
Secretary.

HORTICULTURAL PAPERS AND DISCUSSIONS.

VOCATIONAL AGRICULTURAL EDUCATION.

By R. W. Stimson, Boston.

Delivered before the Society, January 13, 1912.

Education.

Definition and agreement as to terms are important aids to profitable discussion. We are all pretty well agreed as to what is meant by education. Education, as the derivation of the word suggests, means drawing out of the individual the best capabilities latent within him.

In modern usage, education means beginning to draw out the powers of the individual at the earliest possible minute in the child's life, and the continuance of carefully studied efforts for the development of those powers well on into young manhood and womanhood. We do not wait for the child to come to the primary school, or even to the kindergarten; we hold mothers' meetings in order that we may begin with the babe. Four years in high school, four years in college, and three or four in a professional school we do not consider too much time for the proper education of him who shows aptitude for a professional career, whether in medicine, divinity, law, engineering, or more recently, in business administration or in agriculture.

On the whole, we believe that he is best prepared to do the things the world wants done who is longest and most carefully trained; and our pronoun "he" is used in the generic sense — our belief as to the demands of long and thorough training applies to the development of talent, without discrimination as to sex.

Vocational Education.

Within a year or two an attempt has been made to define vocational education. Vocational education, in the usage of the State of Massachusetts, includes all forms of specialized education the

controlling purposes of which are to fit for useful occupations. The aims of vocational education are, therefore, to draw out and develop the vocational capabilities of the individual.

There are those who think that for the practical boy, as distinguished from the bookish boy, vocational education might well begin before the fourteenth birthday. In the elementary schools manual training, gardening, elementary agriculture and the household arts may render an important service by helping children to test their native abilities and discover their special aptitudes. These elements of the public school curriculum have been found valuable aids to intellectual progress, and no doubt in certain cases have helped wise choice of the type of schooling later to be followed.

For Boys and Girls over Fourteen.

In Massachusetts, however, there has been no effort in legislation or in the general policy of the Board of Education to invade the elementary schools with vocational education. On the contrary, vocational education addresses itself to those who no longer are thrust into the schoolroom by the strong hand of the compulsory school attendance law, but who are free to go to school longer or to stay away according as they themselves, or their parents, may determine. Vocational education in Massachusetts, for which State aid has been provided, is, in short, organized and conducted with direct reference to meeting the requirements of boys and girls fourteen years of age or older. Vocational education is, moreover, definitely and frankly vocational. It undertakes to train a boy or girl for farming, for the household arts, or for some trade or industrial pursuit.

Cultural Versus Vocational.

We have long been familiar with high school training for boys and girls fourteen years of age and older. Considering the aims and methods of high schools in general, when classical studies, mental discipline and college preparatory work engage the ener-

gies of the school, perhaps we may symbolize this traditional type of training by a large "C".

C

Then vocational training may fairly be symbolized by a large "V."

V

Usually today, however, even in the cultural school, there is at least a minor emphasis on the value of the curriculum as a direct preparation for vocational efficiency, so that within the large "C" there should appear a small "v". Similarly, in the best type of vocational school there is an essential core of culture, and we should place within the large "V" a small "c". Finally, there are not wanting those who hold that the ideal training of the future will be such that we may fitly symbolize it by a combination emblem consisting of a somewhat reduced "V" superimposed upon a "C" drawn to the same scale. The several figures would then appear somewhat as follows:

Present

Possible Future

Present

The symbol at the extreme right pretty exactly places vocational education, as now practiced and as contrasted with the existing cultural schools of secondary grade. Exactly where on an imaginary line passing from one extreme to the other any given school that has departed from time-honored traditions belongs, can only be determined by examination of its curriculum and its animating spirit.

Limited Appeal of Cultural Education.

Everybody has noticed the enormous falling off in school attendance at the fourteenth birthday. Employers have noticed, too, that those who have presented themselves for work have neither been prepared for good work nor possessed of such mental ability as they have thought public school education ought to have given. A result of observations such as these was the appointment in 1905 of the so-called Douglas Commission on Industrial Education, of which the late Carroll D. Wright was made Chairman, and which undertook for the Legislature a careful study of the conditions with a view to their improvement.

Twenty-five thousand boys and girls were found, fourteen to sixteen years of age, who were not in school and who were not at work, or who, if at work, were engaged in temporary or "dead end" occupations.

Asked why they were not in school, they replied with astonishing unanimity that there was "nothing doing" in school for them. They had a feeling that the school had nothing to give them which would help them to earn a living, and that, in general, the schools were being run for the benefit of those who were to follow clerical or professional careers, not for those who were to enter industrial or agricultural life. Their parents agreed with them, and added that it cost a great deal to keep children in school; that out of school there was a saving on clothing and carfares; that work, even at odd jobs with very little pay, still yielded some income toward the support of the family.

The Douglas Commission, therefore, recommended that a permanent Commission on industrial education, including agriculture, or at least such a Commission to serve for a period of years, be appointed for studying the matter further, with power to aid in the establishment of industrial schools for the express benefit of boys and girls fourteen years of age or older who, in the absence of such schools, as experience had shown, would not be in school at all. The Legislature appointed another Commission and provided State aid for those communities which should establish independent industrial or agricultural schools to the amount of

one-half the cost of maintenance, on condition that the new schools must first be approved as to courses, location, and methods of teaching by the Commission.

An Army out of School.

Almost immediately the new Commission found that to the twenty-five thousand out of school reported by the Douglas Commission, at least fifteen thousand more must be added. The following brief statement regarding the situation has been made by Mr. C. A. Prosser, Deputy Commissioner of Education for Massachusetts:

"A conservative estimate would be that every year in the State of Massachusetts from twenty-five thousand to thirty thousand boys and girls, on reaching the age of fourteen, leave the schools to go to work. This army is four times as large as the group which at approximately the same age enters the high school. Only one out of six of these children of tender years taking up some wage earning occupation has reached the eighth year or grade of the elementary schools; only one out of every four has attained the seventh year; only one out of every two, the sixth year." In *Two States*, January, 1912, a magazine published by the Young Men's Christian Associations of Massachusetts and Rhode Island, Mr. William Chandler Smith, Educational Secretary, has graphically shown the trend away from school by means of photographs. Beginning with a group of one hundred pupils entering the public school, he shows less than fifty at the fifth grade, thirty-five at the sixth grade, twenty-three entering the seventh grade, fifteen eighth grade graduates, and three graduates from high school. These photographs exactly represented the history of a certain city in the holding or losing of its pupils.

A Problem of Conservation.

We talk about the conservation of natural resources. Here is a grave problem; for what can compare in importance, to the nation or to any Commomwealth, with the proper conservation of two or

four years in the lives of thousands of boys and girls flung forward toward maturity in a mass disordered and unimproved? Here are forty thousand whom the traditional high schools have either failed to hold or have positively repelled. And no inconsiderable portion of this number consists of farm boys and girls who, in the absence of vocational agricultural education suited to their needs, will drop out of school on reaching their fourteenth birthdays.

"They are a worthless lot. You can't do anything with them!"

Such a statement as the above, which was made not long ago by a man in the western part of our State, is impossible of acceptance. Granted that some on close acquaintance will be found to be incompetent, fit subjects for schools for defectives; granted also that some will prove to be incorrigible, fit only to be handled by some reformatory or restraining institution, there still remain the great mass who are neither defective nor incorrigible. For these something can, something must be done.

Nor is it possible, with equanimity, to take the ground assumed not long ago by another of our citizens, an educator of some prominence, who said he was not so sure, after all, that it is not a good thing for most boys and girls to leave school at fourteen.

"In the next two or four years," he said, "they will be doing two good things — growing up, and learning to mind. Most boys think obedience is a peculiar requirement made by parents and schoolmasters. The boy discharged from one job, then from another, for a few times, on account of carelessness or disobedience, will at last learn that obedience, discipline, ability for taking orders and carrying them out promptly and exactly, is one of the fundamental necessities of society. Life itself in the workaday world is one of the best teachers of this important fact. Given a boy grown up and taught to mind and you can do something with him."

Advocates of vocational education desire physical fitness and moral tractability, but believe this can best be secured by a well-ordered course of training under proper vocational school conditions.

Through the Individual to the Mass.

Vocational education, it is evident, has a massive problem. Its central concern, however, is not with the mass but with the individual. While this is a day of great aggregates, when we prosecute a trust we look for *the man* higher up. When there is a strike, it is for the ultimate benefit of particular persons. In the rush of school work the class has sometimes blinded the teacher to the individual,—fit cause for repentance. Perhaps you recall these memorable words of Edward Howard Griggs in his preface to "The Story of a Child" by Pierre Loti:

"There are always two points of view possible with reference to life. From the standpoint of nature and science, individuals count for little. Nature can waste a thousand acorns to raise one oak, hundreds of children may be sacrificed that a truth may be seen. But from the ethical and human point of view the meaning of all life is in each individual. That one child should be lost is a kind of ruin to the universe."

Education by Action and Affairs.

Vocational education, sure of the dignity and worth of its task, turns as much to action and to affairs as it does to books and schoolrooms for its teaching materials and methods. This is no concession that its task or its pupils are inferior to those of any other branch of education. In training boys and girls for life, there is no proper place for snobbery. Vocational training is not higher, cultural training is not lower as such on the ethical and human scale, nor vice versa. They are different. Each must have its own methods, its own standards and its own rewards of merit.

We are likely to overrate books and to underrate affairs as educational forces. At the Atlanta banquet of the National Society for the Promotion of Industrial Education, President Elmer Ellsworth Brown, former United States Commissioner of Education, almost startled his audience when he reminded us:

"It was not until the nineteenth century that even one-half of

the civilized world had been to school; that anything like one-half of the civilized world had learned to read and write and had come under the influence of the school. . . . The people of the world, even at the present time, have barely begun to go to school."

Your David Harum may not be long on book learning, but he is not short on wit; the deacon cannot beat him twice on a horse trade. Men school each other. Nature, that sometimes kind, sometimes stern teacher, schools all. Life is a labyrinth of educational forces. Vocational education, in relying less on books, relies more on the activities and actualities of the economic world, and has no fear that its selection of a course or courses to be followed will be wanting in either human worth or educational efficiency.

The serious problem of vocational education, we see, then, is the conservation of the natural resources of childhood,—particularly the years fourteen to sixteen, by educational methods which naturally and effectively appeal to the active, but non-bookish, boy and girl. Mr. Frederick P. Fish, Chairman of the Massachusetts Board of Education, has well put the case.

"Sad is the lot," he says, "of the ordinary boy or girl who leaves school and goes to work at fourteen. The skilled employments have no place for such; they are likely to drift into the very lowest grades of work and stay there for the rest of their lives. If the vocational school were of no value except as a device to keep at school for an additional two years those who would otherwise go to work prematurely, its existence would be justified."

Vocational Agricultural Education.

Agricultural education, as a phase of vocational education, is that form of vocational training which fits for the occupations connected with the tillage of the soil, the care of domestic animals, forestry and other wage-earning or productive work on the farm. Vocational agricultural education is, thus, one phase of the effort toward conserving the valuable years of youth for the best uses of both society and the individual.

There is now a general movement throughout the country for agricultural education of secondary grade. There are probably not fewer than five hundred secondary schools in which agriculture is now seriously taught. The training varies from the study of an agricultural text book in the hands of the general teacher who does not bring to her task any special training, to the out-and-out vocational school where the teachers are specialists in agriculture. Various territorial and political units for the development of such schools have been adopted.

Congressional District Agricultural Schools.

Among the most interesting, from a thorough-going vocational point of view, of the Congressional district schools are those in Georgia. While these schools, under the State law establishing them, are branches of the State College of Agriculture, which, in turn, is a department of the University of Georgia, they are not, judged by Northern standards, to be considered college preparatory schools, not even preparatory schools for the usual College of Agriculture. The law distinctly states that the course of study shall be confined to the elementary branches of English education and practical treatises or lectures on agriculture in all its branches and mechanic arts.

Each school was required to have at least two hundred acres of land. One of the most important sections of the act creating the schools provides that after the first buildings are erected, which shall be only such as are absolutely necessary for temporary use, all work on, in and about these schools, or on the farms or in the shop connected with them, whether it be farming, building, care of stock, or work of different kinds, shall be performed exclusively by the students of these schools under such regulations for the proper division and alternation of the work as may be provided by the trustees. It was desired to encourage the attendance of older men, but even in their cases it has been expressly ruled that no one shall be allowed to enter who does not take the required practical work. "If only literary work is desired, they should go elsewhere."

Each pupil is given fifteen hours a week of classroom or book instruction, nine hours a week of laboratory, field, shop and home instruction, or twenty-four hours of instruction, and nine additional hours for the support of the school and incidentally of practical benefit to the pupil. Thus thirty-three hours of the pupils' time each week is assigned, or a little over five hours a day, to head and hand work. One-fourth of the students, or such number as the Principal may determine is necessary to continue the operation of the farm and shop, must remain on the farm during vacations. For work required during this time students are given fair compensation. Students of the third and fourth years may be given acre plots for individual cultivation, or small farms for supervision, the profits to be their own,—the profits, however, to be applied first to payment of their dormitory or other expenses. Strict accounts are kept.

The second annual report of the University of Georgia, November, 1911, shows that the income from the school farms varied from $395 in the Ninth District to $3,716 in the First District, the total farm products for the eleven districts being $22,832. There is every indication that more, rather than less, emphasis is to be put on the actual productive farming enterprises of the students carried out on the school premises. With a proper correlation of classroom and field instruction, these schools should afford vocational agricultural training of a very high order. The course of study in the Georgia schools extends over four years.

County Agricultural Schools.

Among county agricultural schools, those of Wisconsin are excellent types of the vocational agricultural school. The Wisconsin schools are spoken of everywhere by their friends and advocates as *trade schools* devoted to agriculture. Foreign languages are omitted. Other significant omissions are algebra and geometry. All are co-educational. All maintain courses of study covering a period of two years—eight months each. Each receives support from the State. All require for entrance that students shall have completed work equal to the eighth grade. All admit students

from outside their respective counties. The half-tone illustrations show classes of students removing stumps with dynamite; raising the form for and constructing a concrete silo; operating the level; pipe fitting; forging; carpentering; road constructing with a road machine and studying various types of gasolene engines. The illustrations show the boys in overalls and evidently active participants in the various occupations.

Each county school has some land, but repeatedly it is stated that this land is used for experimental and demonstration purposes. Students evidently use school time for study and for observation, dependence being placed upon the ability of the students on graduation to apply the instruction they have received in school for their own benefit at home. It is found that the county agricultural schools serve a class of people the high schools fail to reach; that their value has been clearly and unquestionably demonstrated. The Wisconsin Commission on Plans for the Extension of Industrial and Agricultural Education, as a result of its observations, recommended that the limit of State aid for each be raised fifty per cent. The trade school, or distinctly vocational character of the instruction given by the Wisconsin county agricultural schools, was particularly emphasized by the relationship of these schools to the University which was proposed by the Commission just mentioned. The Commission recommended that the University of Wisconsin establish in the College of Agriculture a "continuation course" for graduates of county agricultural schools. Thus it is seen that the kind of training here considered is sharply differentiated as to field, content and methods from the training of the ordinary high or college preparatory school on the one hand, and on the other hand from the training for professional service provided in the regular classes of the college of agriculture.

Agricultural Schools at Colleges.

There is a great variety of separate schools. These may be divided roughly into two classes — those located at the State Agricultural Colleges and those not so located. Where located at the colleges, these schools are not preparatory departments to

the colleges so much as they are special finishing schools for men who do not desire a full agricultural college course, but desire the directest and most competent possible training for practical farming that can be had in a course of two to three, and, in some cases, four years, following such preliminary preparation as may usually be found in the common schools of the rural districts.

When the demands for vocational agricultural training are sufficiently limited so that a single school may suffice for a State, it would seem to be highly advantageous that the school should be located at the State Agricultural College. Duplication of expenditure for land, buildings and equipment would thus be avoided. The students might be trained in part by assistants; but, first or last, would become acquainted with, and feel at first hand the influence of, the State leaders in agricultural research and education. In most cases the agricultural college teaching staffs might be expected to adapt their school instruction to the real needs of their school students, as distinguished from their students of college grade. Certainly schools so located have stood high in the estimation of the people. President Northrup once said that there were people in Minnesota — not a few — in whose minds the School of Agriculture stood for the whole University.

Separate Agricultural Schools.

In certain States, New York and Massachusetts among the number, it has been considered inadvisable to maintain vocational agricultural schools on the premises of and in immediate connection with the State Colleges of Agriculture. In these cases the resources of the schools are more or less limited. The courses vary greatly in length and character. Some differ but slightly from the State Agricultural Colleges of earlier days. Others maintain two year courses of six or eight months each, from which have been omitted such subjects as algebra, geometry and all instruction in languages except English. Some utilize a limited amount of land for demonstration and experimental purposes. Others provide for more or less practical farm work on the school farms. In fact, these schools are proving to be most interesting

and valuable experiment stations in methods of vocational agricultural education. Perhaps it is not too much to say that out of the very weakness of some of these schools in land and equipment is coming the best strength of the whole movement for a type of agricultural training which shall be genuinely vocational. That is to say, vocational efficiency at the end of the course of training appears to bear no directly proportionate relation to the comparative amounts of money invested in the school plants and in their cost of operation; and, similarly, it appears to depend more on points of view and on methods among the various staffs, than upon relative faculty numbers and salary budgets.

Profitable Production the Test of Efficient Training.

Productive work of a high order of efficiency is coming to be considered the real test of all systems of vocational education of secondary grade. Particularly in vocational agricultural education, it is coming to be accepted that the training must be such as to develop both skill and managerial ability. The competent farmer must be not only expert in the varied technique of his calling, but also a sound and progressive business manager.

Spectator versus Participant.

Neither skill nor business ability can be learned from books alone, nor merely from observation of the work and management of others. Both require active participation during the learning period in productive farming operations of real economic or commercial importance. A masterful, constructive imagination may accomplish much for him who possesses it, and for his needs books and observation may finally result in vocational efficiency. The difficulty is that such powerful imagination is so rare as to constitute him who has it a genius, far removed from the common run of boys fourteen to eighteen or twenty years of age who live on farms, who expect to follow farming for a living, and whose training is not likely to extend beyond that afforded by the vocational agricultural school.

Danger — too much Reflection, not Enough Action.

In general, if there is a defect in the large agricultural schools, which boys must leave home in large numbers to attend, and which, in order to secure adequate attendance to justify their cost, must apparently limit their training to six or eight fall and winter months, it is the defect of putting too great reliance upon books and observation, to the exclusion during the intensive learning periods of active participation in the type or types of productive farming the boys intend to follow after graduation. Too great, one may almost say in the cases of many of the boys, fatal reliance, is put on the ability of the students once well grounded in sound theory at the school to put that theory into successful practice on their own farms alone and unaided. Even if the large school undertook to put its plant and equipment to the strictest possible productive farming uses of a profitable commercial character, and to induct its students into its aims and to school them in its methods, its efforts would be more than likely to break down through sheer weight of numbers. School farms at present can hardly be claimed to be thorough-going commercial farming concerns. The most flattering school photographs, where the aims of the school are most emphatically practical, show by far too few actual participants and by far too many spectators. To see a thing done, however good the demonstration, is not to do it oneself. To participate in the carrying out of an enterprise planned and ordered by another—by even an agricultural school instructor—may leave one little better than a gang laborer. The pittance paid per hour, where any pay at all is given, can hardly, as an incentive to keen interest and alert action, be considered comparable to the reward the student might hope to realize from an independent enterprise planned and executed by himself and wholly for his own profit or that of his family. It must be feared that however excellent may be its work in selected demonstrations and in certain really valuable experiments, school farming must, from a strictly commercial point of view, always remain more or less artificial. Perhaps the best use to which an agricultural school, large or small, can put its own land or equipment is that of demonstration and experiment. Most

schools appear to have adopted this view. It is not clear, however, that any considerable number have adopted methods of training calculated to overcome their defects as agencies for graduating students thoroughly trained in the practice as well as theory of practical farming.

Most of the schools are far from confining their activities to their own premises and regular school classes. What may be done supplementary to the usual school work has been admirably set forth by Messrs. D. J. Crosby and D. H. Crocheron in Separate No. 527 from the Year Book of the U. S. Department of Agriculture for 1910, under the title "Community Work in Rural High Schools." Perhaps your attention has lately been caught by Mr. Crocheron's illustrated article in the January, 1912, *World's Work*, under the title "A Very Real Country School". Suffice it for our present purpose to say that community work as such is directly planned for the benefit of adults, not for persons in school.

Startling and Stupendous Problem.

The problem then, of providing for actual participation, both as manager and as worker, in productive farming simultaneously with this classroom instruction on the part of the boy in the agricultural school, may fairly be looked upon as the most startling and stupendous problem in the great field of vocational education. How shall it be solved?

The Georgia Plan.

Georgia has attempted its solution, apparently, by requiring the officers and students of the Congressional district agricultural schools to create a considerable portion of the equipment and buildings of those schools, and to improve the land and make it commercially productive; also by proposing a method of reward for competent work, in part by payment per hour for half the labor performed, in part by the plan of profit sharing within fixed limits, and in part by the assignment to each student of an acre or more

of land to be cropped for his exclusive benefit. It proposes, as we have seen, to require the attendance of one-fourth of the students through the entire growing and harvesting season.

The Massachusetts Plan.

Massachusetts has developed another plan for the solution of this problem. This plan was fully set forth in the report submitted to the Legislature in January, 1911, by the Massachusetts Board of Education. The Legislature has provided State aid for carrying this plan into effect. A vocational agricultural school may be established by any town or city, or by any group of towns or cities which may voluntarily form themselves into a district for this purpose. Evening school classes in agriculture may be established by any school committee. The State has not been definitely divided into districts by the Legislature. To the present Legislature the Massachusetts Board of Education is, however, submitting a bill suggesting the details of legal procedure for the establishment of agricultural schools by counties.

Provided an agricultural school, day or evening, large or small, taught by one teacher or more, with or without school land and live stock, with training extending over two, three or four years, a school in general agriculture, or in such specialized production as market gardening—provided an agricultural school is approved by the Massachusetts Board of Education as to

> "organization, control, location, equipment, courses of study, qualifications of teachers, methods of instruction, conditions of admission and employment of pupils and expenditures of money"

the community, voluntary district, or county maintaining it, is entitled to reimbursement from the treasury of the State to the extent of one-half the amount expended for maintaining the school from funds raised by local taxation. The State in agricultural, as in industrial education, contributes nothing towards the initial cost of the land, buildings or equipment.

Vocational agricultural departments may be established in selected high schools. The agriculture must be taught by a spe-

cially qualified teacher who gives his exclusive attention to agriculture. His vacation must be taken during the winter months, January, February and March. He must continue his work throughout the summer. Little stress is laid on land or operations at the school-house. Every possible stress is laid on the utilization of the land and equipment at the homes of the pupils, and it is the instructor's duty during the summer to supervise work prepared for by the agricultural classes, from seed time to the securing of the harvest. In the cases of such departments, the State will reimburse the communities maintaining them to the extent of two-thirds the salary of the agricultural instructor.

Part-time Work in Agriculture.

A fundamental feature of the Massachusetts plan is embodied in what has been termed "part-time work in agriculture." The term "part-time work" is a descriptive expression brought over from current discussion of certain forms of industrial training, for use in unfolding the possibilities of this new type of training in the field of agricultural education. Part-time work in industrial education means that the student spends part of the time required for his training in the shop or manufacturing establishment, and part of the time at the school building, both school and shop work, however, being intimately related and supplementary to each other. Part-time work as applied to agricultural education means that the student must spend part of the time required for his education in productive farm work, preferably at home, and part of his time at the school, the farm work and school study to be closely correlated by the school at points selected from season to season or from year to year, and to be given the highest possible educational value by competent school supervision.

Economy, Efficiency, Adaptability.

The part-time work plan reduces the cost of agricultural training of secondary grade so as to place effective training for the farm within reach of many communities which would otherwise be un-

able to secure it. Fifty departments in fifty groups of farms would cost no more than five large schools such as those found in other states. It obviates the necessity of sending the boy away from home in order to secure the benefits of agricultural training. The cost of living for the boy is less at home than it would be at a boarding school. Parents who need the help of their boys are deprived of their services during only a portion of the day. The plan also promises to be wonderfully effective. Co-operative work between the school and the home farm is the most effective known means of trying out under the conditions of individual farms, over widely scattered areas, methods which have proved to be profitable elsewhere, as for example, at the State Agricultural College or Experiment Station. Such co-operation furnishes the only experimental means by which each boy can try out the merits of the home farm as an agency for producing profits when treated by the best known methods; that is to say, part-time work furnishes the only means whereby the principles and methods taught by the school can be positively adapted by the boy to the economic conditions on the farm on which he may spend his working days. Part-time work thus gives to agricultural teaching the reality of actual life as but little school training can give it. Under the part-time work plan, the instruction is adapted to the kinds of farming prevalent in the district surrounding the centers where the work is established. The practical applications of the instruction are thus subject to the obstacles continually encountered under economic farming conditions found in any given district, just as they are also aided by all the influences in this Commonwealth which make for the improvement of farming.

Productive Farming as Educational Projects.

The plan as an educational process is believed to possess unquestionable merit, because farming activities readily resolve themselves into what may be termed farming projects. Let us turn this matter over carefully a moment in our minds. A farming project is a thing to be done on a farm. The thing done may contribute some element of improvement about the farm,—as constructing

a concrete walk leading to the front door; planting and nurturing of shade trees; the making and maintaining of an attractive lawn. The thing done may be of an experimental nature,—as the planting of an untried variety of fruit, the feeding of an untried ration, the testing of an untried spraying mixture, or the testing of one or another of much advertised roofing materials. Finally, the thing done may be of a productive nature, as the growing of a crop of clover or alfalfa; the growing of a field of potatoes; the growing of a crop of silage corn, or the production of eggs for the market. A farming project is, further, something to be done on a farm which involves a limited and definite amount of equipment, materials and time, and which is directed toward the accomplishment of a specified and valuable result.

Finally, *a farming project*, as the term is here used, *is a thing to be done on a farm which, in the preparation for doing it and in the carrying of it out to a successful result, involves a thorough-going educational process.* The improvement project of constructing a concrete walk to the front door might involve a study of the nature of cement; its action on sand, gravel and broken stone; its resistant qualities to the weather; the seasons in which it might be used; its cost as compared with other materials, such as boards, plank, tar, brick, flagging and asphalt; the mathematical determination of proportions of sand, cement and stone to be used; the geometrical determination of the sections into which it should be divided, and whether it should be crowned or flat; the geographical sources of the raw material and the commercial conditions for purchasing the cement. The experimental project of planting an untried variety of fruit might involve a study of the probable adaptability of the variety selected to the soil on the farm, the climate of the locality and the market demands within reach of the farm. The productive project of growing a crop of clover might involve a study of the various varieties of clover; the comparative adaptability of those varieties to the given field on which the crop must be grown, and to the climate of the locality; the most reliable places for the purchase of seed; the best time for seeding; the best time for cutting; the best methods of curing and storing; the mathematical calculation as to the saving in cost of feeding stuffs which the crop would afford; the chemical elements it would furnish in the ration;

and the beneficial chemical, biological and mechanical effects on the soil in which it would be grown.

School Projects and Other Farm Work.

The project method of instruction, moreover, fits in nicely in its relation to the usual farm activities of the boy. The boy may help with the milking throughout his course, where the object is to get the cows milked as quickly as possible and where no records are kept. During certain months of at least one year, the school should require whatever time may be necessary for keeping an accurate record in pounds and ounces of the yield of a part of the herd. This may be limited to the weighing of milk from a single cow and giving the cow credit for what she produces.

It may be part of the boy's business to assist in feeding the cows. During part of his course sufficient time should be given for weighing the ration and charging at least one cow with what it costs to keep her.

In the original routine to which he has been accustomed in milking, much or little attention may have been paid to the cleanliness of cows, utensils, or the person and clothing of the milker. During part of his school training, the boy should be given whatever time may be necessary for milking at least one cow and preserving her milk under absolutely sanitary conditions, and for sampling the milk for bacteriological tests at the school.

In the original cropping of the farm, much or little attention may have been paid to leguminous crops. During one season at least facilities should be given the pupil for growing a patch of moderate size of clover, and for observing the effect of introducing a large proportion of clover into the ration of the cow.

In the ordinary conduct of the farm much or little attention may have been paid to the selection and testing of corn for seed. But, prior to planting, one season at least, the boy should be given whatever time may be necessary for making germination tests of the corn which it is proposed to plant; also during one season the boy should be given control of a portion of the cornfield for

making an "ear to row" corn test, for observing the difference in yield between different ears of corn,—all the corn from one ear being planted in one row, and all the corn from another ear being planted in another row.

In the ordinary routine of the farm it may be that the boy is required to tend the poultry. During at least one year he should be given control of at least one pen of poultry, and facilities for feeding a balanced ration and trap nesting individual birds for comparison of productivity in laying.

It may be part of the usual work of the boy to help cultivate and harvest the potato crop. During one season at least he should be given facilities for testing the value of the use of formalin for the prevention of potato scab, and of the Bordeaux mixture for protection against potato blight.

It may be part of the usual work of the boy to assist in the apple harvest. During one season at least he should be given facilities for pruning at least one tree, spraying it, if it is at all infested by scale, of cultivating under it and fertilizing it. During one season, also he should be given facilities for grading and packing the fruit from at least one tree and of disposing of the product with a view to securing fancy prices for at least part of the crop. If he could be given control of a block of five trees, and were a fairly husky boy of fifteen to seventeen, the rewards for his work and incentives to intelligent action would be so much the greater.

Counting the Cost of Farming.

An essential feature of the part-time method of training is the consideration of cost at all points. The boy by this method learns first of all through his own experience that there can be no product without cost and no profit without excess of receipts over all expenditures. After such an experience he will not be likely to undertake a new enterprise without a serious attempt to estimate accurately his probable profit. The boy is subjected to the prevailing economic conditions under which the home farm must yield a profit or loss at the end of each year of work. The methods by which the boy becomes on a small scale a farmer or business man

for himself gives the project which he is carrying on, and the school work in which he has participated, a reality not otherwise attainable. It heightens measurably his interest in the work and in the related study of the school, and must fix better than by any other device the training which he is receiving.

Parents Pledge Home Co-operation.

One indispensable condition prior to the establishment of the agricultural departments which are now at work was that the parents of the boys who desired to take the course should agree to furnish the home facilities necessary for the practical carrying out at the homes of the boys of the teachings of the agricultural instructors.

Advisory Committee.

Another condition precedent to the establishment of vocational agricultural school work in any given locality is the appointment of an "Advisory Committee" consisting of five progressive farmers to co-operate with the agricultural instructor, or instructors, in adapting the agricultural training to the particular needs of that locality. It is considered desirable, moreover, that at least one member of this committee shall be chosen from among the parents of boys in the agricultural classes.

Promising Solution of Problem.

The Massachusetts plan has attracted wide attention among educators, and its results are being watched with the greatest interest. It is believed that home farm work, supervised by the school, where conditions are at all like those in Massachusetts, might well be substituted very generally for the present methods of much work, little work, or no work at all of a managerial nature, now found in connection with vocational agricultural school

training; and that the project method of bringing agricultural science immediately to bear on actual farm practice, in going commercial agricultural enterprises, conducted by the boys themselves, is a promising solution of our most pressing problem in this field of vocational training.

Young People Respond.

The Smith's Agricultural School at Northampton, Massachusetts, beginning with the school year 1908–1909, has employed a man throughout the summer for the express purpose of assisting the boys in applying the teachings of the school in their home farm work. This method immediately appeals to the motor instincts and activities of boys of secondary school age. The success of boys in the corn growing clubs in may states shows that boys instantly respond to help at home.

A school boy of sixteen at the recent Massachusetts Corn Show won the sweepstakes against all comers, including the sweepstakes winner of last year at the big New England Corn Show, for the best single ear of corn and also for the best collection of ten ears. He had been given seed by the former winner, and had been told and shown out of school hours what to do, and when and how to do it on his father's land. The man who helped him said "That boy has pumped me all summer!" Most boys, like most men, learn best by being told and shown on the field of action.

Earning and Learning.

This method offers the boy, all too eager to quit school for work on reaching his fourteenth birthday, a strong incentive to continue in school; because it bids fair to make him an earner while still a learner. Boys like to feel that as members of the family they are at last able to pay their own way.

Cultural and Agricultural.

The division of time in carrying out the school and home farm co-operative method of training, whether in agricultural departments in high schools or in the separate agricultural school, is as follows: For the execution of the projects, including work during vacations and other out-of-school hours, 50%; and for the related study 30%. The remaining 20% of the time of the boy is devoted to general culture and good citizenship instruction, wherein systematic courses may be provided in such subjects as English, history, civics, current events, mathematics and science.

Farming and Good Citizenship.

Good results have already been achieved. It is believed that the Massachusetts plan of vocational agricultural training will justify itself from every reasonable point of view, and will prove to possess undeniable merit as a method of training both for farming as a definite calling and for intelligent and vigorous participation in the community life of the Commonwealth.

THE GOVERNMENT POLICY OF PLANT INTRODUCTION.

By David Fairchild, Washington, D. C.

Delivered before the Society, with stereopticon illustrations, January 20, 1912.

It is now fourteen years since Congress first appropriated twenty thousand dollars to be expended in securing rare and valuable seeds and plants from foreign countries for the use of the experiment stations and special experimenters, and it may well be asked, "of what special benefit has this expenditure been to the country?"

The policy of Federal Plant Introduction as it has been shaped through the experience of these years is in some essentials different from the policy of most countries which maintains government botanic gardens and through them distribute plants to the public. Instead of building up a great collection of plants, which is expensive to maintain and represents only a small area of the country climatologically, the whole country, as it were, has been treated as one great arboretum and testing garden and sufficient quantities of seeds or plants distributed to special experimenters to insure the discovery of the region best adapted to their cultivation. Every imported plant species, variety or strain has been recorded historically by its publication in an inventory, which is on file in every agricultural library in the country. Every imported plant has been given a number and in the inventory is printed a record of where it was found, and when, by whom collected and sent in, and why it is considered worthy of the attention of the American agriculturist and horticulturist. This inventory, started in 1898, contains, quite independent of its value as the record of introductions, a mass of original observations made by trained explorers in foreign countries regarding the plant industries of these various regions, and since over twenty men have been sent on exploring trips in search of seeds and plants, and the correspondents who

have contributed to the pages of this inventory include most of the great horticulturists of the time which is covered by the last decade, the 35,000 descriptions contain a mass of information about our cultivated crops which will in itself be well worth all the money it has cost to print it. Horticulturists are well aware of the neglect which botanists have paid to cultivated plant varieties. Nowhere else are so many of these varietal names recorded from all over the world, often with explanations of their meaning. When one considers how great the financial interests are which depend upon a plant variety, the mere recording of the information as to where these great varieties of the world are to be found is not without its value.

In the actual bringing in from foreign countries of over 30,000 plant strains, varieties or species much that is valuable has been learned. The best methods of packing and shipping, the easiest methods of note taking and labelling, and the quickest, safest but surest methods of ascertaining whether the new seeds or plants were clean of weeds or fungus pests or insect enemies. No factor has been greater in developing a clear policy with regard to plant quarantine than this constant stream of new plants coming into Washington. The alfalfa seed had dodder in it and months of experimenting were spent in devising ways of cleaning it. New weevils were found in the beans and peas, and sure, safe methods had to be devised to destroy them. A scale insect new to science was found infecting the base of the leaves of our date palms and a method of paring the offshoot to get rid of it was devised. New smut fungi attacked our bamboos and had to be gotten rid of, new rots appeared in our aroids and we had to learn how to store them. In short, the examination which it has been deemed necessary to subject all our seeds and plants to has opened up a field of research in the study of foreign plant diseases which we are likely to introduce into America. A glimpse at the plant diseases of the world has been afforded by these thousands of new plants brought in.

In using as a great testing field the whole country it was necessary to have a chronological record of everything sent out in order that years hence, as trees grew tall and owners died or memory failed, some clew at least would still remain which would enable those coming after to determine where the strange tree came from.

Many thousands of cards systematically arranged compose this history of the National work of Plant Introduction, and every year the entries multiply with increasing rapidity. This spring the number of distributions will total in the neighborhood of 40,000.

To deal with plants without the aid of photographs very early appealed to us as quite an impossibility and a photographic atelier was established for the sole purpose of keeping a photographic record of the new plants and their behavior. Ten thousand photographs are the result and I doubt if anywhere in the world there can be found so great a range of horticultural photographs, both of this and of foreign countries. 'Tis a motley collection, it is true, but it records each advance made in the development of every new plant industry with which we have been working. There is no single factor in the problem of plant introduction which compares with the new factor of the photograph. To be able to show a photograph of a new fruit or vegetable or forage crop is the first step toward interesting a stranger in it and no amount of word picturing can convey a clear idea of a strange new plant.

To propagate quickly and from all sorts of budwood the new plants and get up a stock for sending out to experimenters has required the building up of two special propagating gardens which in themselves are remarkable affairs and represent a mass of accumulated nursery experience with a very wide range of new plants and an acquaintance with their idiosyncrasies. Old methods of propagation have been adapted to new problems and the inarching of seedlings scarcely out of the seed-leaf stage has shortened the long wait from planting to fruiting. The asexual propagation of a new forage plant like alfalfa has made it possible for Mr. Meyer, our explorer, to dig up rare species from southern Russia and Turkestan, which he discovered in the winter, and have ready a stock for field trial or hybridization in the spring.

The general knowledge of the agriculture of other countries which the explorers sent out for seeds and plants have acquired and communicated to their colleagues has contributed no small part to the development of the great investigating force of the Department of Agriculture. The seed collection of the Office which is growing at the rate of a thousand or two specimens each year in which a representative of every seed shipment received is

preserved, is already proving of great value in the work of identification.

And last but not to my mind by any means least is to be mentioned as in the category of indirect accomplishments resulting from the Government Policy of Plant Introduction, a new feature which will this spring characterize our distributions. It has long been a dream of mine to send attached to every experimental plant when it goes to an experiment station or private experimenter, an adequate descriptive label in permanent form so that for three years at least every time the experimenter sees the plant he may read a statement about its value and requirements and this without returning to his house or library and looking it up in a book. It is a curious fact that on the one hand the seedsman prints an account of a flower or vegetable on the envelope of his penny packet of seeds and you are forced to throw the description away when you discard the packet at the time when you plant the seeds, while on the other hand he merely pencils the scientific name on a wooden tag when he sends you a dollar plant, and the copper wire either strangles your plant if you leave it on or the tag splits and is lost if you tie it to a stake. We expect to accompany each new plant distributed the coming year with a fifty word description on a permanent label and have devised a simple method of preparing these labels which may be found worthy of adoption by nurserymen generally.

But of all the factors in this great problem the psychological one is perhaps the greatest. I consider it no small accomplishment to build up through judicious selection of plants and through careful presentation of the experimental character of the material a corps of several thousand experimenters. To know that all over the country they are watching with critical attention the behavior of these new immigrants, not because they have been deceived into thinking the plants are of great value but because they enjoy to experiment with new plants, is a great satisfaction, and when I look back to the skepticism of a former Secretary of Agriculture, whose declaration was cabled to me in Corsica that there was no reason for bringing in new plants, and compare it with the great optimism of Secretary Wilson, without whose support Government Plant Introduction would be today in as chaotic a state as it

was twenty years ago, I feel we who have built up the work have cause to be gratified that the world of intelligent people have moved forward and taken a world standpoint.

If therefore none of the thirty-odd thousand plant species or varieties which have come in under Government auspices should have proven great successes there would still remain a mass of valuable material to warrant very substantial expenditures.

But successes have come in this plant introduction work which have far surpassed the dreams of the little group of enthusiasts who started it.

Making due allowances for the land speculation which has found in date culture in California a peculiarly attractive lure to the eastern tenderfoot, the American date industry may be said to be passing into the commercial stage. At the present time a private firm has its agents in Algeria buying a thousand date suckers for commercial plantings. The largest date importer in the country has expressed astonishment at the excellent quality of the dates produced in the Salton Basin. The fifteen acre date orchard established by the Government at Mecca, California, has attracted thousands of visitors to it this year, and the individual private orchards which are springing up around it and the purchases of land suitable for date culture indicate that those who have made the closest study from a practical point of view of the date situation are willing to put their money into it with the idea of making a living out of the cultivation of the date palm. The crop this year from the Government and private gardens has amounted to many tons of dates and the best of these have been purchased locally at fancy prices. There seems, therefore, to be no question of the constant and growing demand for these American grown dates whenever they are properly ripened, and the artificial method of ripening them which has been practised by Department experimenters has turned out a product which is as good as the best imported article. Naturally there have been some surprises and many disappointments in this work, and some regions which were first selected as suitable for date growing have proven ill adapted for this purpose. This problem, therefore, is really past the experimental stage of plant introduction and become a project of the Office of Crop Physiology and Plant Breeding. There are

certain questions concerned with the insect parasites which attack the date palms which will have to be given more consideration in the future than they have been in the past, although methods of controlling some of the most important parasites have already been devised and there is no reason to doubt that adequate means for protecting the date palms from these insect parasites will be devised. There is no question, it seems to me, that Mr. Walter T. Swingle, whose name will always be associated closely with the American date palm industry, has laid the foundation of one of the most fascinating monuments which anyone can erect to himself in his own country.

Although there is no project upon which the Office of Foreign Seed and Plant Introduction has expended more time and money than that connected with the importation of foreign alfalfas, it is still difficult to determine the exact money value of these introductions. It can be said, however, that the introduction of the Turkestan alfalfa, by Prof. N. E. Hansen, which was followed by the securing of species of Medicago from every corner of the world, has started experiments in the selection and breeding of this important forage crop which will result in the development of strains adapted to all the varying conditions of our great western country, strains which will be as hardy doubtless as the yellow flowered *Medicago falcata* from Central Siberia, suited to the northernmost regions of this country, and winter growing forms as succulent and adapted to irrigation conditions as the Peruvian and Arabian alfalfas are in Southern California. In other words, as a result of this introduction work the term alfalfa has come to mean a great number of distinct varieties, the characteristics of which are recognized by the farmers. It is doubtless true that the increased production in certain arid regions of the Turkestan alfalfa has increased the money value of the lands by many hundreds of thousands of dollars.

The introduction of the durum wheat, which in 1898 was quite unknown in this country, is actually producing for the farmers who grow it in those regions where the ordinary fife wheats cannot be grown many millions of dollars over and above what they could reasonably expect to get from growing other crops. The public is already well aware of this unusually successful piece of intro-

duction work, with which the name of Mr. Mark A. Carleton as its pioneer will always be associated.

The California Nursery Company, which soon after its introduction secured cuttings of a seedless table grape called the Sultanina rosea, has been propagating and selling cuttings to the public, charging the highest prices yet paid for any of their grapes, and the growers of the Thompson seedless variety are planting it as a larger fruited and more attractive form for shipment to the eastern market. This variety was found near a monastery near Padua, Italy.

I believe the mango industry has come to stay in Florida, Porto Rico, Hawaii, and perhaps in California. The introduction of the best East Indian varieties and their fruiting out has, I believe, convinced those skeptics who were acquainted only with the turpentine seedling varieties that we have in the East Indian mango one of the most delicious and richest flavored fruits in the world. The fancy fruit dealers have passed their verdict upon these East Indian varieties and plantings on a commercial scale are being made at the present time. The project has become of sufficient importance to demand nearly the whole time and attention of a special expert of the Office.

While I am talking to you here today my assistant, Mr. R. A. Young, is addressing the enthusiastic residents of the little town of Brooksville, Florida, on the subject of the dasheen, which he has been investigating for the last four years and which was first brought to the attention of the public by the investigations of Mr. O. W. Barrett while horticulturist in Porto Rico. There is no question about the possibilities of this new root crop for the South which contains ten per cent more protein and half again as much starch as the potato. It can be grown where the potato does not do well, is a large yielder, and produces its crop when there are no potatoes in the local markets of the South except those shipped in from the North. As a food plant it deserves to find a permanent place on our menus. Several tons of seed tubers will be planted next year to furnish distribution material to hundreds of experimenters who have applied for material with which to test it on their own farms.

The introduction of the wild peach of China, used there quite generally as a stock for all stone fruits except the cherry, has at-

tracted sufficient attention to its possible value for this country to create a demand for the seed by private individuals in California and Oregon. The fact that trees in orchard form in central Iowa proved hardier than the Hill's Chili, supposed to be the hardiest peach grown there, indicates its possible utilization along the northern belt of peach culture in the United States, while its behavior in the southwest indicates a drought resistance which can scarcely fail of utilization in California, Arizona and Texas.

In the utilization of the bamboo in this country, which is a problem that will require many years to solve, the first step has been successfully taken and bamboo groves of the Japanese timber species are now successfully growing in northern Florida and Louisiana, and the use of a single Indian species as a windbreak has been successful in Texas. Whether or not the edible bamboo will find a home in this country remains yet to be seen. Plants of this species with which we have experimented have shown themselves unsuited to the surroundings in which we placed them.

The Tamopan persimmon of north China which Professor Sargent predicted several years ago would be worth a half million dollars if introduced and grown extensively in this country, has been brought in by our Explorer, Mr. Frank N. Meyer, and after being fruited it has been propagated for small orchard plantings in the Southern States. While the preliminary trials of this persimmon on roots of the native Virginia species have not shown it to be as hardy as we hoped it would be, they have proved beyond question that in this four-inch persimmon which is normally seedless and much less astringent than the ordinary Japanese and American forms we have a valuable acquisition to the list of American fruits.

To give a list merely of those beginnings which at this time seem unusually promising would require more time than you would care to listen to me. I could tell you of our experiments with the wood-oil tree of China, the Zante currant of Greece, the pistache nut of Sicily and its relative from China, the carob of the Mediterranean, the avocado of the western tropics, the South African Carissa, the South African forage grass discovered by Cecil Rhodes, the Chinese jujubes, the wetland Eucalyptus from Timor, the Sudan grass from Khartoum, and even the noted mangosteen from the Malay Archipelago, trees of which are now growing on the Canal

Zone, but I will close with a plea for my pet vegetable, which I hope to see some day as common in New England as it is now in Japan. I refer to the Japanese udo, *Aralia cordata,* which is as easily grown as asparagus, is a decorative hardy perennial, and is as characteristic in its flavor as celery or rhubarb. It would be a strange thing if New Englanders should first make the acquaintance of this vegetable through the advertising channels of the California asparagus growers, one of whom is planting forty acres at the present time.

Discussion.

The question was asked if the Department of Agriculture had introduced anything suitable for cultivation in New England.

The Lecturer replied that the Department had introduced certain varieties of apples and pears but no new fruits as yet. There are few lands subject to such low temperatures as we have in New England. Only in the northern portions of Russia, Manchuria, and China can be found an area such as is found in this section of the country. Experiments are now being carried on with a species of Chinese jujube but have not yet sufficiently progressed to claim much for it. The jujube will flower in February and even after freezing will produce another set of blossoms. It furnishes a large industry in the Shantung province of China and it is thought that it can be grown in New England. It also resists drought to a remarkable degree.

The line we are working on principally is the development of stocks suitable for New England. We have overlooked in a measure the character of the stocks upon which our fruits are grown. The question of cherry stock has received some attention. The Mahaleb and Mazzard stocks are now used extensively but they blight badly and are subject to a variety of leaf diseases. Nurserymen have not investigated sufficiently the Japanese cherries. What we know of this stock is that it is less liable to disease and the Japanese use it for grafting purposes. It certainly should be tried.

Experiments are also in progress with the Chinese peach as a stock for peach culture but we are not yet far enough along in our investigations of this particular problem to be of much interest here.

Kenneth Finlayson inquired as to Japanese methods of grafting and if they used different methods from those commonly in use here.

The Lecturer answered that he was somewhat disappointed in the Japanese methods. They do not understand the art any better than we do. In grafting dwarf trees they are very clever and interesting as for example in the small species of Thuya which they make a work of art but they have developed nothing practical for our fruit growers.

INSECT PESTS OF THE ORCHARD AND GARDEN.

By Prof. Edson F. Hitchings, Orono, Me.

Delivered before the Society, January 27, 1912.

We are facing a problem of grave importance to our Commonwealth. One cannot estimate the vast inroads into our national resources cause by the myriads of insect pests that menace our very existence; they constitute a vast army that is flanking us on every hand; there are bugs to right of us, bugs to left of us, bugs in front of us, sucking and chewing us. "There's not to make reply, there's not to reason why," there's but to fight and spray, if success be ours.

They may infest our clothes, our food, our bodies, all vegetable growth, all animal life; in fact the mineral world is not exempt; the air we breathe and the water we drink are replete with animal life: even our brains go "bug house" sometimes. Each animal has its parasites, each plant its enemies.

We will cite a few losses due to insect depredation. It is stated on good authority that the annual loss to the apple industry of the country by the codling moth alone amounts to over $12,000,000. In some seasons the strawberry weevil has reduced the crop 50% in North Carolina.

The annual loss to our truck growers from insect pests amounts to about 20% of the crop, but by judicious methods of control this might be reduced to 5%. This shows the need of up-to-date methods to reduce the high cost of living — which affects the masses — the cost of high living is not so important. Here in New England we have a good illustration of insect depredation in the gypsy and browntail infestation; then there is the Hessian fly of the west; the cottonboll weevil of the south; and last but not least we will cite the losses to human life due to the typhoid fly, and the malarial mosquitoes.

Entomology has come to be recognized as one of the leading sciences in the field of research in modern, economic agriculture.

We will now consider the following factors in the control of insect pests —

1. Practice clean culture.
2. Secure a vigorous plant growth.
3. Encourage bird and other friends.
4. Know our beneficial insects.
5. Learn the life histories of our insect pests.
6. Destroy all refuse material where insects hibernate.
7. Look out for wild food plants.
8. Use up-to-date methods to destroy the several stages of insect life.

The subject under consideration is "insect pests of the garden and orchard." Before specializing on the above named pests, I think it will be well to briefly define an insect and give its life history as far as a simple type is concerned. An insect is a true hexapod, a six-legged animal, having three divisions of the body, viz: head, thorax, and abdomen; it breathes through openings along the sides of the body.

The life history of a perfect insect is represented by the four stages *viz*: egg, larva, pupa, and imago. These four stages are entirely different, very distinct, and should be thoroughly understood in order to wage a successful warfare against any particular foe.

The following general conditions should be recognized: 1st, the eggs in all cases are inactive, or dormant; so, in themselves, cannot be harmful or injurious; 2nd, the third stage — the pupa — being the stage of transition from the full grown larva to the adult, must of necessity be one of no external activity, therefore of itself can do no harm; 3rd, the fourth stage — that of the perfect insect — in the majority of cases, though it be one of great activity, is not one of a direct injurious nature, as its real mission is the perpetuation of the species. Of course, there are exceptions to this among some of the orders as in the case of many of our beetles, which, in the adult stage, feed upon the foliage of plants; 4th, this leaves the second stage — that of the larva — as the leading, injurious period in the life history of the insect.

It is during this stage that the growth of the insect is made and it must necessarily, in the majority of cases, cover a large percent of its life-cycle.

This being the case we can readily see how important it is that we learn to recognize this stage of our common insect pests, so as to more successfully control their depredations.

We will next consider them in relation to their food habits, dividing them into the following groups, viz: (a) sucking insects (true bugs, plant lice, scale insects, etc.); (b) leaf-eating insects (tent caterpillar, brown-tail, gypsy etc.); (c) root feeders (wire worms, June beetles).

Knowing the food habits of an insect we can the more readily apply the remedy. Those under (a) must be handled by means of a contact spray such as kerosene emulsion, whale oil solution, tobacco decoction, and in the case of scale, lime-sulphur solution. By contact spray we mean that the liquid must be forced on to the insect itself so as to come in contact with the breathing pores. In many cases this is quite difficult on account of the curling of the leaves, especially in the case of so many species of aphis or plant lice.

(b) Leaf eating insects are more easily kept under control for several reasons. In the first place they are more exposed to the attack of predatory and parasitic insects, birds, and diseases. In the second place their food plant can be sprayed with some poisonous solution like lead arsenic, Paris green, etc.

The two remaining classes (c) and (d) are among the hardest to subdue — they are more protected. They have not as many enemies. It is a hand to hand fight either by mechanical means or by the use of poison baits.

We now come to a consideration of the outline previously suggested —

1*st, Practice Clean Culture.* This is the most important step in the control of insect pests. The practice must be carefully adhered to year after year. Under this head the weed problem deserves a passing notice. Many species of weeds offer good feeding ground for some of our insect enemies. In many cases there are other causes at work. The old saying regarding the number of kernels of corn to the hill is an apt one:

"One for the blackbird
Two for the crow
Three for the cut-worm
And four to grow."

To sum up — if clean culture is *strictly* adhered to at least one-half of the battle is won. In cases where an insect has secured a strong foothold we may have to resort to one or more of the following methods:

Practice rotation of crops. Deep fall plowing. Change to a different location.

2nd, Secure a Vigorous Plant Growth. Plants are much like human beings. If we can secure healthy, vigorous plants they will tend to ward off disease and insect attacks. Vigorous plant growth can only be attained by thorough cultivation and high fertilization. We have known many cases where the green aphis of the apple has been entirely balked by the thrifty growth of the new shoots, so that spraying was unnecessary although the pests were much in evidence.

3rd, Encourage Birds and Other Friends. We cannot overestimate the value of our bird friends in this relation to the solution of the insect problem. They are a host in themselves and we should look to their protection with the utmost vigilance; especially the following — bluebird, chickadee, chipping sparrow, flycatchers, kingbird, martin, meadowlark, nuthatches, phoebe, robin, song sparrow, swallows, thrushes, vireos, warblers, etc.; and for night birds I would include the nighthawk and whippoorwill. The two great offices that the birds fill in the economy of nature, as applied to the gardener and orchardist, are the destruction of insect pests, and the reduction of the bountiful crop of weed seeds.

It has been stated on good authority that if our bird friends were all destroyed the earth would be stripped of vegetation and thus become uninhabitable. I saw a statement not long ago regarding the amount of food consumed by a robin; it stated that a young robin consumed at least fifteen feet of worms each day; at this rate, on the supposition that Maine has 60,000 farms and that there is one pair of robins to nest on a farm each season and that each caterpillar averaged one inch in length, if these could be

placed in single file and marched from Boston they would reach around the world twice and as far as China on the third lap.

If one pair of robins to a farm in the state of Maine alone could accomplish this feat, what might we expect of the great army of other varieties of birds that are equally voracious. Of our other friends perhaps the toad plays the most important rôle. The Ohio Experiment Station Bulletin states that a single garden toad during the months of May, June, and July consumes 9,720 injurious insects; including such species as cutworms, weevils, ground beetles, etc. English and French gardeners pay $25.00 per hundred for them. Skunks, moles, and even snakes play an important part in insect control.

4th, Know our Beneficial Insects. We need to know our friends as well as our foes. Our friends are found among the parasites; predaceous bugs and beetles; Tachanid flies; scavengers, etc. The extensive work done by the Federal Government in conjunction with the state at the insectary at Melrose Highlands is recognized by all students of entomology.

5th, Learn the Life Histories of Our Insect Pests. This is quite an undertaking but is highly important and very essential to success. The outline of the different stages in the life history of many of our injurious insects has already been given. With this as a guide one can learn to recognize the leading ones found in the garden and orchard.

6th, Destroy All Refuse Material Where Insects Hibernate. We are beginning to realize the importance of this statement. Quite a percent of our garden and orchard pests pass the hibernating period under cover of stones, pieces of boards, refuse piles of weeds, discarded vines, brush heaps, bark of trees, etc. Habit is one of the leading factors in the success or failure of an undertaking; therefore let us get into the habit of keeping things of this class picked up and destroyed. No refuse should be allowed to remain but should be gathered and disposed of by burning. A good convenient, out of the way place should be provided and all material of this nature carted there and destroyed. This method will not only tend to control insect pests, but many of the fungous diseases as well.

One fruitful source of insect increase is found among the weeds

that grow in the neglected fence corners, along stone walls, in pastures, by the roadside, and in too many of our gardens. Until such places receive a share of our attention our percentage of loss will continue to run high. It is safe to say that the stone walls of New England harbor each year enough injurious insects to reduce the revenue from our farm and orchard crops by at least 5%. Add to this the lack of care in removing and destroying other refuse, such as dead limbs on fruit trees, small fruit bushes, etc. we shall raise this amount to 10%. With a direct loss of from 15 to 40% due to insect and fungous troubles, added to the above, leaves the average farmer with but 50 to 75% of his crop, due to these causes alone.

7th, Look Out For Wild Food Plants. This applies to plants closely related to the ones under cultivation, as many insects pass through the first larval stages, feeding on weeds and other wild plants, and easily migrate to the cultivated ones later in the season. Clean cultivation and the removal of all wild plants growing in fence corners will materially check the development of insect life in the orchard and garden.

8th, Use Up-to-Date Methods in the Destruction of Insect Life. We are beginning to realize, as never before, the absolute necessity of the intelligent and persistent use of insecticides, fungicides, traps, and baits to control, as far as possible, the annual loss occasioned by these ever present and insidious pests. I recall my first experience in insect collecting. There was but little literature on the subject. The admirable work of Mr. Harris on the Injurious Insects of Massachusetts was the only available work at the time. In killing the moths and butterflies I used a large darning needle dipped in a solution of oxalic acid; this was thrust into the thorax of the victim and the specimen held between the thumb and finger until the dose took effect. Later this was followed by ether or chloroform and more recently by potassium cyanide. Equally crude were the methods used in insect control. When the Colorado potato beetle first appeared in New England the only weapons used by the farmer were an old tin pan and a shingle. Armed with these he would walk along the rows and laboriously knock the offending beetles and slugs into the pan and when a sufficient number were gathered, they

were treated with a dose of kerosene and then cremated, or else they were buried alive — much to their own comfort and enjoyment. Even in recent days, after all that has been written regarding the tripeta or railroad worm of the apple, the question has often appeared "why not plow a furrow, rake the apples in and bury them." Such ignorance is not excusable at the present time, as our Experiment Stations, State Departments, and Federal Government have all contributed reports, bulletins, and leaflets on this subject. For many years Paris green was the panacea to sound the death knell for insect slaughter, but since the dreaded gypsy and browntail have caused such wholesale destruction of all forms of vegetation and the San José scale has become so prevalent in the east, other and more effective remedies are imperative. Lime-sulphur for the scale and lead arsenate for all leaf eating insects were recognized at an opportune time, and are the leading insecticides of the present.

It would be practically impossible to take up the many insect foes. Their name is legion and time does not permit of the task. We will therefore abbreviate our list and cite a few of the most important ones under each class.

Of our fruit insect pests the following are the leading ones to be considered –

On the Apple — (a) root: — woolly aphis, forming galls.
(b) trunk: — round and flat headed borers.
(c) branches: — woolly aphis, oyster shell bark louse, San José scale.
(d) leaves: — bud moths, leaf rollers, gypsy and browntail, tent caterpillar, red-humped, yellow neck, tussocks, canker worm, fall webworm, etc.
(e) fruit: — codling moth, curculio, maggot, tarnished plant bug, etc.

On Small Fruits — (a) currant and gooseberry: —sawfly, fruit worm.
(b) blackberry and raspberry: — cane borer, root borer.
(c) strawberry: — weevil, crown borer, slug, June beetle, tarnished plant bug.

Garden Insects — (a) plant lice (aphides), squash bugs, tarnished plant bug.
(b) cutworms, maggots, wire worms, white grubs.
(c) flea beetles, weevils, caterpillars, etc.

As found on asparagus, beans, cabbage, corn, cucumbers, onion, pea, radish, squash, tomato, turnip, etc.

Discussion.

An inquiry was made concerning the life history of the green aphis.

The Lecturer replied that there were many species of this insect. Almost every plant has its own distinct species and they are among the most destructive pests we have. Those that infest the apple, for example, are different from those infesting the plum.

They are insects that propagate very rapidly and a single female and its progeny might produce during the season to the number of five millions. They do not lay eggs but produce their young alive, all females during the season until the autumn, when both male and female are produced in readiness for another year.

They exude a sort of honey dew of which ants are very fond. Sometimes this honey dew is so abundant that it drops upon the sidewalk under the trees.

Concerning the white grub the Lecturer stated that it is one of the hardest insects to combat. Fall plowing would destroy many of them as well as other insect pests.

Cutworms, of which there are a large number of species, do much damage. Some are nocturnal in their habits and sometimes climb shrubs and trees and strip the foliage. He once noticed a locust tree that was being defoliated but could find no insect at work upon it until he put a burlap band around the tree. The next morning there were two quarts of cutworms under the band and he kept on until over a peck was captured. Other common remedies for the cutworm trouble are to place tin cans or collars of stiff paper over the young plants and a poison mash of meal and Paris green.

Regarding the infection of the roots of fruit trees by the woolly aphis the Lecturer advised never planting a young tree thus affected for the infestation will remain in the ground. This trouble can only be remedied by treatment with carbon bisulphide. The nurserymen say that their stock is fumigated, but their method is to tie the trees in bundles, put them in a house, and subject them to a treatment of hydrocyanic acid gas for forty minutes which could not penetrate the bundles in that time. The bundles should be separated and then treated for that length of time which should be sufficient. The gas is very deadly and the greatest caution should be used in handling it. The quantity used should be regulated by the age and tenderness of the plants to be fumigated. Cases have been known where the roots of fruit trees have been injured by this process causing at length the death of the trees planted.

The question was asked if the railroad worm could be controlled.

In reply the Lecturer said that the best remedy was clean culture. The little fly that lays its eggs in the apple is about half the size of a house fly. Pick up the apples that drop and destroy them for they contain the worm that goes into the ground and changes in the spring into the fly ready to lay its eggs again. You can get rid of them after a few years by following up this practice.

DISCUSSION OF FLOWER CULTURE.

Opened by Robert Cameron, Cambridge, Mass.

February 10, 1912.

The usual Saturday lecture took the form today of a general discussion of the subject of flower culture. Robert Cameron, Superintendent of the Botanic Garden of Harvard University, opened the discussion speaking in part as follows:

I have been asked to open a discussion on flowers. This is too large a subject to discuss at one time as it would not only include all outdoor flowering plants but also all greenhouse flowering plants, therefore I will confine my remarks more to hardy outdoor material.

Within the last decade there has been a general horticultural awakening in this country; one can feel it and see it all around. Every city of any consequence has its parks, commons, and playgrounds, and immense sums of money are spent each year on these places. These places should not only be health and recreation resorts, but should also be institutions of learning so as to teach the people the examples of gardening that are best adapted for this country. City officials should see to it that parks are made interesting and attractive for the people so as to draw them out of the crowded streets to see the bright flowers and enjoy the fresh and invigorating air.

I have often thought that the large parks are generally too far away from the crowded parts of most cities and that city officials should compel street railways to give very much reduced rates to these places so that they would be used more. We don't give this enough of serious thought. Just think the benefit it would be to cities if they could make people of the populated streets, especially the children, live more in the parks. It would not only have a great influence on their health but also on their morals.

The more we can get the people interested in plants and flowers the better citizens we shall have. Playgrounds should be made attractive with shrubbery and flowers so as to interest the children.

This love for flowers and the beautiful is not confined to cities and private individuals. The railroads are very much interested now and they are spending large sums of money and in every way trying to encourage this love of flowers and the beautiful by offering prizes to their employees for the best kept grounds, so in this way gardening is spread right across the continent. With these few words pointing out how the love of flowers is spreading throughout this country let us turn to our subject — flowers.

I have thought that very little attention has been paid to having gardens for different seasons. That is to say spring gardens, summer gardens, and autumn gardens. Many persons nowadays have three separate places to live in at these three seasons and I think that they would get much more pleasure if they filled their gardens with plants that would bloom at a certain season than to make beds and borders that will give continuous bloom at the same time. I will try and give a list of plants that would give good results at each of these seasons. But before giving lists of plants let us first consider some of the essentials necessary to have a pleasing and satisfactory garden.

The first essential in making a garden of any kind is that the person who is going to do the planting should not only know the names of the plants, but the height, habit, and the color of the flowers and foliage, and the most likely places they will grow in. One also ought to have good taste in arranging the various plants so that the flowers that are in bloom at any given time will group well in form and color. It also requires study and forethought to get the best and most suitable plants for the different seasons. So, if we are to have beautiful gardens, the chief point we should keep in mind is to use the plants with careful selection and definite purpose always aiming that they will make beautiful pictures. Two borders and beds may contain the same number and kinds of plants; the one may be planted in such a way that everything is jarring, displeasing, and unrestful, while the other may be planted with the same material, but in such a way that it makes an impression of pleasing satisfaction, in fact it makes a series

of satisfying pictures. To learn to see the difference in these pictures and how to put them in their right places is to recognize gardening as a fine art.

In forming plantations and making borders the right thing to do is to place the plants with such care that they will form a part of a harmonious whole.

The Color Scheme.

We do not give enough attention to our color scheme and in almost every garden this is a weak point. Much of the success of a garden depends on giving thought and study to get pleasing color effects. Many times good material is useless in our scheme, either from ignorance or lack of forethought. A plant may not be ugly in itself but when placed in a wrong environment may make a distasteful picture.

The Spring Garden.

Spring is the season when we enjoy flowers the most because after our long dreary winters we love to see the beautiful little harbingers of spring. The earliest of these flowering plants are rather low of stature but they are very rich in color. The first to greet us is the snowdrop of which there are several species but those that give the greatest satisfaction are *Galanthus nivalis*, the common snowdrop, and *Galanthus Elwesii*. They should be planted in colonies. We have had them in bloom as early as January, but they were grown in sheltered nooks. March is the month when they make the boldest show. Hepaticas are charming on account of their blooming and thriving in shady positions and are valuable for such places. The squills are unrivalled as dwarf blue plants and *Scilla sibirica* and *bifolia* are the two best kinds. They will grow in any kind of soil and in almost any situation. When once planted they need very little attention and will increase themselves by seeds if left undisturbed. In sunny posi-

tions early in March the crocuses begin to make a show in the grass and in the borders. The first to make their appearance are the yellow kinds, they are soon followed by white and blue varieties. If planted in borders amongst herbaceous plants at least fifty corms should be used in a clump. They are especially pleasing when planted in grass in places where it will not be cut too early in the season. We would advise buying the best corms obtainable; they are a little more expensive but give much better satisfaction. The best blue varieties would include Baron Von Brunow, King of the Blues, Ne Plus Ultra, and Pres. Grant. In whites these kinds are good: Caroline Chisholm, King of the Whites, and Queen Victoria. In striped varieties, Albion, King of the Striped, and Sir Walter Scott. In yellow, the best is the one know as the Largest Golden Yellow. Along with the crocuses comes the glory of the snow or Chionodoxa. They make a beautiful sheet of blue. They should be planted in broad masses and will very soon increase and will last in bloom for about a month. The best kinds are Gigantea, Luciliae and sardensis. The winter aconite or *Eranthis hyemalis* flowers along with the snowdrops and its yellow blossoms are so different from anything else in bloom at this time that on that account it is quite an acquisition; it does well in shady nooks and is not particular about the soil it grows in.

Snowdrops, scillas, glory of the snow, and winter aconite are about all the plants we can look for in March, but these little gems should be planted by the thousands.

April Flowers.

April comes with a wealth of flowers in addition to the above. In the shade of trees and around rhododendron beds we find masses of dog-tooth violets, or Erythronium; the species americana, albida, and dens-canis are the easiest to grow, and they spread rapidly. For carpeting rhododendron beds there is nothing better, and their mottled foliage is always pleasing. The spring snowflake is a lovely early flower, but we seldom see it. It reminds one of a large snowdrop and at the end of April it makes

a charming plant. It is hard to get good bulbs of this early plant in this country, and probably this accounts for its being scarce.

The tallest plant of all the bulbs at this time is the crown imperial, *Fritillaria imperialis*. It is a valuable addition to the border on account of its height; it breaks up the flatness where so many dwarf flowers are in bloom. There are several varieties but the one named Rubra is by far the best grower. The guinea-hen flower, *Fritillaria meleagris*, is also pleasing with its checked flowers.

The grape hyacinths are too seldom seen in gardens; they are charming little plants, the species botryoides and its variety alba are probably the most common. But the variety Heavenly Blue and commutatum should be included. In borders clumps of a hundred bulbs make a stunning effect in early spring. Irises of the dwarf kinds are interesting at this time. *Iris pumila* and its many varieties make choice plants for the front of the border. *Iris olbiensis* is quite hardy and has many varieties.

The white rock cress begins to bloom in April and makes a pleasing mat of white. *Arabis procurrens* is a rarer kind but equally hardy; it blooms in May. The spring bitter vetch, *Lathyrus vernus*, is a very valuable plant and is the first of the pea family to bloom. It grows in tufts about a foot in height and is covered with bluish violet flowers. *Alyssum saxatile* or gold dust is one of the most valuable of early yellow flowers. It likes to be grown in exposed positions where it will get plenty of sunlight but does poorly if water settles about it in winter. *Trillium grandiflorum* and *Uvularia grandiflora* may be grown in moist, shady places.

The first of the tulips to bloom is *Tulipa Kaufmanniana* or the waterlily tulip; it flowers about the middle of April and is a perfect beauty. It should be in every garden, not in beds but in clumps in the border. The early tulips begin to bloom towards the end of the month, but they are so well known that we will pass them by for the present.

The *Adonis vernalis* is valuable on account of its large yellow flowers. It is seldom seen in gardens probably because it does not like to be disturbed often. *Veronica gentianoides* is the first of the speedwells and it makes a nice mat of blue in the front row of the border. *Viola palmata, v. canadensis*, and other species

along with the bloodroot make charming effects under deciduous trees. Another plant which is showy at this time is *Puschkinia scilloides*, it resembles the squill family but grows taller. The color of its flowers is bluish white. *Phlox subulata* and its varieties make stunning effects in the front row in the border or in dry positions in the rock garden. The Iceland poppy is charming on dry sunny borders or in the rock garden; there are several good varieties. Before the end of the month many of the earlier daffodils will be in bloom and their grace and beauty add much to the effectiveness of the garden. Henry Irving, obvallaris, minimus, maximus, and Horsfieldii are amongst the earliest to bloom.

May Flowers.

The month of May is ushered in with plants of larger growth than those in early April. The flowers of April continue through the early part of May if the season is not too hot. In addition to the early daffodils there are scores of other kinds in bloom during the first two weeks of May. Those we will recommend are cheap but they are the most showy and thrive the best. Amongst Yellow Trumpet daffodils the following kinds are good, Emperor, Glory of Leiden, Golden Spur, Henry Irving, maximus, obvallaris, P. R. Barr, Shirley Hibberd, and Spurius. The following varieties of Bicolor Trumpet daffodils are all showy and are easy to grow: Empress, Grandee, J. B. M. Camm, Madame Plemp, Mrs. Walter T. Ware, Portia, and Victoria.

The Sulphur and White Trumpet daffodils are beautiful and interesting. The varieties are albicans, Madame de Graff, moschatus, Mrs. Thompson, Mrs. Goldring, and W. P. Milner. The Star daffodils or *Narcissus incomparabilis* are especially graceful and are by far the best to plant in grass or amongst shrubbery. Good varieties are Autocrat, Beauty, Consul Crawford, Frank Miles, Sir Watkin, and Stella.

The following varieties of Narcissus Barrii are good: Barrii Conspicuus, Flora Wilson, General Murray, and Golden Mary. The Eucharis-flowered Narcissi, N. Leedsii, are perfectly charming and grow and multiply in the borders. The best kinds are Amabilis,

Duchess of Brabant, Duchess of Westminster, Minnie Hume, and Mrs. Langtry.

Narcissus poeticus with its varieties are amongst the most valuable we have in the garden. They increase more rapidly and give more flowers than any other variety. The varieties grandiflora, King Edward VII, ornatus, and poetarum are the best ones to grow. *Narcissus poetaz* is a new race that is going to have a great run in this country as they increase so rapidly and flower so profusely. They are perfectly hardy. They originated from a cross with *Narcissus poeticus* and one of the Polyanthus Narcissi. There are about eight varieties. We have grown the variety Elvira for several years and it is most pleasing and satisfactory. The other varieties we have grown are Aspacia, Ideal, Irene, Klondike, Profusion, and Triumph. The Jonquils are all hardy and delightfully fragrant.

Tulips are the showiest and gaudiest flowers we have in May. The early kinds are valuable for massing effects in beds and borders and there are an immense number of varieties. The following kinds are good. In white, La Reine, Joost Van Vondel, Pottebakker white. In yellow, Chrysolora, Goldfinch, Mon Tresor, and Yellow Prince. In pink, Cottage Maid, Pink Beauty, Queen of the Netherlands, and Queen of the Pinks. In scarlet and red the best are Artus, Belle Alliance, Vermillion Brilliant, and Vesuvius. A few other good kinds are Duchess of Parma, Prince of Austria, and Keizerkroon.

It is very gratifying to note the great interest that is being taken in the late tulips such as the Cottage tulips, Darwins, and many of the species. They are the most important of all the tulips for garden effects. They are a little more expensive than the common tulip but they are worth the difference in price. The Darwin tulips are improved breeders and are self-colored mostly. They are the most graceful of all the tulips. Some of the nicest and most pleasing are the following: Gretchen, rosy pink with pale blue base; Glory, fiery scarlet color; Gustave Doré, pink; Clara Butt, very fine form, delicate salmon-pink; La Candeur, white; Pride of Haarlem, dazzling cerise; Mr. Farncombe Sanders, crimson red; Mad. Krelage, soft rosy pink, Mrs. Cleveland, rosy pink; and Torch, fiery red.

The best of the cottage tulips are Bouton d'Or, beautiful yellow, like a large buttercup; Elegans; fulgens; Gesneriana and its varieties; Shandon Bells; Parisian yellow, one of the finest late yellow; Picotee, white with narrow margin of pink; and Ingelscombe, scarlet.

There is a large number of species of tulips and some of them are amongst the finest of all the tulips. *Tulipa Greigi* is the queen of all tulips, the flowers are large and of scarlet-orange color; Fosteriana is grand; linifolia is a beauty; Sprengeri is the latest tulip of all, it blooms in the beginning of June.

If tulips are used in beds they ought to have a carpet of some low plant, such as pansies, forgetmenots, English daisies, *Silene pendula,* or some of the violets.

Hyacinths are not as popular as they used to be. They are stiff and ungraceful and they only last for a very short time. Yet after all when they are in bloom they have charming colors.

English primroses are especially useful in the spring garden and always have a charm for lovers of early flowering plants. *Primula denticulata* is a lovely plant when grown in masses and is perfectly hardy. *Viola cornuta* has a beautiful blue flower and when planted in large masses makes a striking effect; there is a fine white variety of this plant. *Aster alpinus,* although only a few inches high, has the largest flowers of any aster that we grow. It is a superb plant for the front row of the border or on elevated positions in the rock garden. One of the most graceful plants we have in spring is *Dicentra spectabilis* or bleeding heart. Columbines are charming and are pleasing in any kind of position. The Rocky Mountain variety, *Aquilegia caerulea,* is one of the best; chrysantha, glandulosa, and Stuarti are excellent kinds; and the new hybrids are very showy. *Stellaria Holostea* spreads rapidly and makes showy mats of white in the front of the border. Another useful plant which gives fine touches of blue to the front of the border is *Veronica rupestris. Saxifraga cordifolia* and *S. crassifolia* are bold plants with large flowers. These are only a few of the many good plants that bloom in the spring; there are scores of others equally good but these will suffice to show that there is no lack of material to make the spring garden showy and interesting.

Shrubs that would flower and make backgrounds for these low herbs would include the early flowering Magnolias, Forsythia, Berberis, *Cydonia japonica*, *Kerria japonica*, *Rhodotypos Kerrioides*, several species of Prunus and Pyrus, *Ribes aurea*, *Cornus Mas*, Halesia, Spiraea, Lilacs, Deutzia, and Dogwood. March, April, and May would be the three months for the spring garden.

The Summer Garden.

The summer garden should contain the majority of plants that would produce flowers in June, July, and August. The first great floral feast at this time would be the German irises. They are the poor man's orchids and they are not at all fastidious about soil or situation and will grow in almost any place whether it is in shade or sunshine. A few of the finest kinds are Mrs. H. Darwin, Victorine, Mme. Chereau, Jacquiniana, Queen of May, Bronze Beauty, florentina, and the pallida dalmatica section. As these are fading away the Siberian iris begins to bloom and the variety Orientalis is extremely rich in color. One of the first of the bellflowers to bloom is *Campanula persicifolia*. It has several good varieties that are especially valuable as garden plants, such as *Moerheimii humosa*.

Foxgloves are good for grouping effects and they are showy and graceful plants in the border; they grow well in almost any kind of soil. The perennial larkspurs are the noblest and stateliest plants we have in June and July. The finest kinds are the various hybrids. There are many species of Pentstemons that are most effective and quite hardy which are seldom seen; *Pentstemon digitalis*, *diffusus*, *ovatus*, *spectabilis*, and *barbatus var. Torreyi* are the best kinds. The hybrid Pentstemons are charming plants, are easy to raise from seed, and will flower the first season if sown early. Sweet William is an old-fashioned plant and is esteemed as one of the finest of hardy plants. There are fine strains and by raising them from seed they come almost all of them true to color. The Oriental poppy should not be left out of the list. Its flowers do not last long but they are extremely showy and brilliant; it is one of the noblest of hardy plants. It is a strong grower and

will do well in any kind of soil if it is not too wet in winter. Peonies are amongst the most beautiful of hardy plants and play a very important part in the summer garden. There are so many varieties that it is hard to say which is the best; it is very much a matter of taste. After they are done flowering the beds look unattractive but there are several kinds of lilies which do well amongst them and produce flowers for the remaining part of the summer.

The showiest plants of July are Japanese irises; they are not hard to grow if they are given damp soil which is well enriched. They dislike shade and do as well on the margin of a pond as anywhere. There is an endless variety of colors, many of them perfectly beautiful.

A garden would not be complete without a collection of perennial phloxes and perhaps they are the most useful of all hardy plants. We have them in blossom from April until September. There is an endless variety of colors and it is only a matter of taste which are the best kinds. They like rich soil and plenty of water; young plants give the largest trusses of flowers.

There are so many kinds of plants that blossom in the summer that I have no time to describe them, but the following kinds should be grown for the summer display: Achillea, Aconitum, Alstroemeria, Anchusa, Anthemis, Anthericum, Bocconia, Campanulas, *Chrysanthemum maximum*, Dianthus, Eryngiums, Funkias, Gaillardias, Geum, Gypsophila, Day lilies, Lathyrus, Monarda, Pyrethrums, Rudbeckias, Scabious, Spiraeas, Thalictrums, Verbascum, and Veronicas.

Roses are the most important shrubs that blossom during the summer. The Hybrid Perpetuals or the old garden roses are going to be displaced by the Tea and Hybrid Tea roses. Instead of blossoming for only a few weeks as the Hybrid Perpetuals do the Tea will produce flowers all summer. Rhododendrons and Kalmia are useful for their gorgeous blossoms. *Vitex incisa* is showy in July when there are very few shrubs in blossom. The different species of Philadelphus are especially useful for white effects and they are easy to grow. Spiraeas, Viburnums, Hydrangeas, and Deutzias are the most important shrubs.

The autumn garden should begin in August and continue to the end of October, although if the weather is mild there will be

some flowers in November. Autumn is generally rich in tree and shrub coloring and this in itself adds much to the effect of the autumn garden.

The month of August ushers in a host of yellow blossoms. We have Rudbeckias, Heleniums, Helianthus, golden rod, Coreopsis, and many others. The asters or Michaelmas daisies make excellent garden plants and are not used enough in our borders and wild gardens; the species laevis, ptarmicoides, patens, novae-angliae, novae-belgii, turbinellus, and Shortii all take to garden cultivation and produce sheaves of flowers. Boltonias, which are close relatives to the asters but grow taller, help to remove the monotony of yellow shades with their myriads of white star-like flowers. The ironweeds are seldom seen in gardens and are valuable because they have showy purple flowers. The three kinds are *Vernonia arkansana, altissima,* and *noveboracensis*; these three will give blossoms for two months. A race of plants that is not seen enough in gardens is the varieties of the late flowering clematis of the heracleaefolia group, such as tubulosa, Davidana, Savatieri, and Lavallei. Lilies are important and are always pleasing and graceful; those that will give satisfaction are candidum, elegans and its varieties, Hansoni, Brownii, canadense, superbum, excelsum, pardalinum, tenuifolium, tigrinum, umbellatum, Henryi, and auratum. *Anemone japonica* and its varieties are the finest flowering plants we have; plant them in sheltered places where the first frost will not destroy the flowers. Gladiolus, dahlias, and Montbretias may be added to these as well as the hardy chrysanthemum.

Annuals are especially valuable in keeping up the display. The best and most popular annual today is the sweet pea; the next is the China aster; and probably the third would be the nasturtium. Marigolds, poppies, African and French marigolds, Cosmos, Drummond's Phlox, Petunias, Mignonette, Zinnias, Salpiglossis, Schizanthus, and Salvia splendens are all valuable plants and most of them will bloom up to the frost.

Begonias now play an important part in summer and fall gardens. The varieties of *Begonia semperflorens* make very effective masses of color and they are so easy to raise from seed. Tuberous begonias are grand and they will grow in shade where many other plants will not grow.

The autumn garden should contain many of the fruiting shrubs which are so brilliant at that late season.

Even in winter gardens can be made attractive by growing plants with showy bark. Cornuses, *Kerria japonica*, willows, birches, beeches, and scores of others; and to these can be added evergreens which are always pleasing amongst deciduous shrubs.

I have merely touched on this subject but as this is a discussion on flowers, I have left plenty of gaps open so that each one will have an opportunity to say something. This discussion on certain topics is for each and everyone to take a part in, and to spread this love of and interest in flowers which are so apparent at this time in this country.

I have not touched on the cultivation of many of these plants neither the arrangement nor yet winter protection, so that there is ample opportunity for specialists in certain groups to give some of their valuable information.

Discussion.

Thomas H. Westwood spoke on the subject of spring-flowering bulbs. He had planted thousands of them in grass at Forest Hills Cemetery and expected grand results from them. He had snowdrops in flower in January. He had also set out ten thousand plants of violets in one plot with satisfactory effect. He discouraged the use of so much variegated material in planting, preferring green foliage, and spoke appreciatingly of geraniums in beds.

He said that it was a difficult problem to arrange a garden so that the colors would be harmonious and that it was a real fine art to accomplish this result.

Mrs. Pratt spoke of the increasing interest in gardens all over the country. In a recent visit to the West as far as California she had been impressed with the growing interest in flower culture especially in the cities. In some of the western cities flowers are planted everywhere except in the very busiest streets. She referred to public parks in California where are planted a million white roses and a million red roses. She noted a lux-

uriant growth of flowers everywhere showing the spirit that existed in the subject of the beautifying of our cities. She also called attention to the importance of the color scheme of our gardens and said she was glad to bring this message from the far west of the interest in horticulture pervading that section of the country.

Kenneth Finlayson spoke on the subject of Pyrethrum culture which he said was one of the most showy flowers of the early summer. He advised fall planting as the best time to set them out, and by making cuttings a large collection could be had in a short time. They need deep, moist, well-drained soil. There are many beautiful varieties among them; and the double ones last longer and are to be preferred.

Mr. Finlayson referred to Mr. Cameron's statement that the public parks are too far away from the city and said that the object of parks is to draw people away from the cities and therefore ought to be at a distance. He referred to the wanton destruction of plants and flowers in the parks by children and also by grown people as well and said that park managers would be glad to do more planting if it were not for this discouraging feature.

The question was asked as to the desirability of growing the Eremuri in this vicinity. Mr. Cameron replied that he had tried them without much success. They were rather late in flowering and were apt to be cut down by frosts.

Joseph Clark remarked that the Eremurus does well on the coast and he thought that E. Bungei was one of the handsomest herbaceous plants we grow.

A lady inquired concerning the winter protection for the perennial border, and for a remedy for the larkspur blight. Mr. Cameron answered that herbaceous perennials should not be covered until after the ground is frozen. It is best not to cover too early but to remove the covering early in the spring. The larkspur blight is a fungous disease and he recommended spraying early in the season with bordeaux mixture.

Duncan Finlayson said that if you want success with annuals planting in pots is a great advantage. He used cold frames in all his work and had no need of a greenhouse.

He said that cold never kills plants; it is the freezing and thaw-

ing that does the damage. Too thick coverings injure plants and he preferred to use evergreen branches and straw so that there might be an air space. He advised not to uncover too early in the spring as one night of frost might kill everything, so tender were the plants after a whole winter of covering.

Mr. Smith recommended the peony as the plant that would give the best results. It required no winter protection and while in flower nothing could equal it. It surpassed even the rose. He advised planting phloxes for a succession of bloom.

Kenneth Finlayson also spoke in praise of the peony and said that there were not many plants so appropriate for park decoration as this.

A lady inquired how many years it would be safe to plant pansies in one place.

Mr. Cameron replied that if the soil was well prepared they could be planted twenty years in succession. He had grown them in a bed for ten years.

Mrs. Pratt asked for information regarding the tradition that sweet peas could not be grown successfully in the same place a second time, and if it was a necessity for the rows to run north to south.

Mr. Cameron said that it was necessary that sweet peas should have fresh soil every year, but he thought it did not make any difference in which direction the rows were planted.

Duncan Finlayson remarked that sweet peas can be grown in the same place if soil is renewed every year. He recommended taking soil from a pasture and mixing with it lime and ground bone.

Kenneth Finlayson stated that one of the essential things in sweet pea culture was moisture.

The question was asked if there was any advantage in the fall planting of sweet peas.

Duncan Finlayson replied that there was none. He had tried fall planting and spring planting and could see no difference in results.

DISEASES OF THE CHESTNUT AND OTHER TREES.

By Dr. Haven Metcalf, Washington, D. C.

Delivered before the Society, February 17, 1912.

The John Lewis Russell Lecture.

The principle of conservation of forests has been so thoroughly discussed, and at least the major lines of activity for the next few years so thoroughly laid out, that this question needs no discussion even by way of introduction. Under American conditions the most important feature in the care of forests is forest protection, and this subject falls mainly into three divisions: protection against fire, against insects, and against fungous and other diseases. If we extend our survey beyond the living forest and take into account the decay of timber, due probably wholly to fungi (although the rôle of bacteria in this regard is practically uninvestigated) we see that we have an enormous field of investigation and that the activity of fungi is in the long run responsible for the deterioration of more property than the forest fire itself. The preservative treatment of timber as it is being evolved in commercial hands and under the leadership of such an organization as the Forest Products Laboratory, maintained by the United States Forest Service at Madison, Wis., is solving the problem of the control of timber decay in a practical way. The pathological aspects of this work are of great interest (1, 2) and are being made the subject of continuous investigation.

Preventive Forest Pathology.

In forest pathology we have to deal with trees under two cultural types: first, the trees in the forest; second, shade, ornamental, and park trees. When we come to consider the question of com-

mercial control, which from my viewpoint is the principal aim and end of forest pathology, we see that we have two very different lines of attack, conditioned entirely by commercial considerations. A shade or ornamental tree has great individual value. It is under constant observation, or should be, and we can employ in the prevention of disease the methods of control that have been evolved with such remarkable success in the control of orchard-tree diseases. In other words, we can spray, we can adopt elaborate systems of pruning and wood surgery, we can follow such quarantine methods as are now used in the control of pear blight and other diseases in the Pacific States (3, 4). Along these lines forest pathology may be expected to evolve together with pathology of fruit trees and general refinements of the practice of horticulture.

When we consider diseases of the forest, however, commercial conditions are quite different. It is not possible to give the individual tree any considerable attention. We must consider the forest *en masse*. This being the case, it is apparent that there is indicated for forest pathology a line of evolution quite distinct from that which characterizes the applications of pathology in horticultural practice; and for the present I may say that this development will be along the line of what a physician would call "preventive medicine," as is the case in animal or human disease when we are considering the species *en masse*. Unquestionably the prevention of disease, rather than the cure, is the important thing in any branch of plant pathology. The elaborate treatment of hollow trees, constituting a part of what is at present known as tree surgery and which has been built up on a wholly empirical basis, must give way in a few years to a more sane and simple preventive horticultural practice. The time to treat sap-rot or heart-rot in a tree is not after the heartwood or sapwood is rotted and the tree has become hollow, but years before, when the bark has just been torn off, perhaps by the teeth of a horse, and two or three square inches of wood are exposed. It is the man who goes over his young shade trees at least once a year with his dish of coal-tar who at the end of twenty or fifty years will have trees that require no heavy bill for tree surgery.

So far as this country is concerned, forest pathology is the

newest branch of plant pathology. During the past few years we have made in the Department of Agriculture a disease survey of the national forests. Many fungi, such as *Echinodontium tinctorium* or *Polyporus amarus*, which five years ago were mere mycological curiosities or wholly unknown, have been discovered to be serious enemies of forest trees (5, 6, 7). I may briefly indicate the lines of attack upon some of these forest diseases, and first I may speak of the diseases of reproduction.

Forest Nursery Diseases.

When a tree reproduces itself naturally in the forest the great majority of young seedlings perish before they have "passed the kid's lip, the stag's antler." It is therefore necessary that in large reforestation operations the young trees be started in nurseries, and so there has been built up a large forest nursery practice, private, state, and national, which every year is enormously increasing. Now every person present who has attempted to grow even a few forest tree seedlings, particularly conifers, knows how they suffer from damping-off and related diseases of infancy. We have set ourselves to no less a task than the overcoming of these damping-off diseases by the use of soil fungicides, and have so far met with very good success. If damping-off and related nursery diseases can be overcome in a practical way, one of the greatest factors in the way of artificial reforestation will be removed. This problem is so closely related to soil and weather conditions that it will probably have to be worked out variously for different sections of the country. For conifer seedlings sulphuric acid is the most hopeful soil fungicide, according to the researches of Spaulding (8) and Hartley (9). This has the advantage of killing weeds and stimulating germination of the conifer seeds, in addition to preventing damping-off. It has been successfully applied by Spaulding in New York and Vermont, and by Hartley in the sandhill section of Nebraska: it is yet to be tested in other parts of the country. Another destructive disease "blight" affecting yearling or two-year-old conifer seedlings, has in Nebraska and Colorado yielded readily to a modified system of watering and shading.

Another disease which is essentially a reproduction disease is the white-pine blister rust (10, 11). Trees affected with this disease rarely survive the twentieth year and the greatest loss comes in the nursery. This disease is not indigenous to America but has been introduced within the past ten years in nursery stock imported from Europe. Just what this disease will do if allowed to gain a foothold in this country we do not know, and we cannot afford to take the risk of waiting to find out. A disease which effectively prevents the cultivation of white pine in three northern countries of Europe should not be permitted to gain a foothold in this country if we can help it. I believe I am safe in saying that at the present time the white-pine blister rust is under control. We know of no places in America where this disease now exists; but there are many localities where it has been found that must remain under suspicion for years, and there must not be the least relaxation of vigilance in the attempt to stamp out this disease. Fortunately for us, the blister rust has been for fifty years the subject of serious study in Europe. The life history of the parasite was known and many of the biological relations of the disease; hence the great facts regarding its control were perfectly understood when it reached this country. The present control of this disease in America and its ultimate eradication, if we can hope for this, furnish the justification, from the practical man's standpoint, of fifty years scientific research on this disease in Europe. Would that we were as fortunate in the case of the chestnut bark disease and other epidemic diseases, in having at our disposal the result of years of antecedent research!

Forest Tree Diseases.

In the control of such diseases as the heartrots, the mistletoes of the West, the pin-rots of incense cedar and cypress we have recourse only to slight modifications of silvicultural practice which will enable such diseased trees to be marked for removal when the forest is cut. I can only indicate this procedure thus, in the merest outline. Suffice it to say that these methods are being developed and are in practice, so far as developed, in four of the six districts of the national forests.

In the Department of Agriculture an office to study forest diseases exclusively was not organized until 1907. The State experiment stations and private investigators have paid little attention to forest diseases from the first. The result is that as we survey the field the fact that most impresses us is our ignorance on the practical aspects of the entire subject. Before we can actually accomplish much in the way of control we have got to discover, in many cases, the cause, the symptoms, and above all the biological relations of any given disease, before we can even suggest preventive or curative measures. So far as possible these fundamental researches must be made; but this is exactly what is the hardest thing to do, for it is most difficult to get either financial or moral support for work of this sort. The community pays the physician for his routine services; but if one physician desires not to cure disease but to investigate how disease now incurable may be cured in the future, the community has little support for him.

The Chestnut Bark Disease.

I wish to speak to you primarily on the subject of the chestnut bark disease by way of giving point to these preliminary remarks, and I may say that epidemics which appear with relative suddenness demonstrate more clearly than any other classes of disease our need of fundamental knowledge. The chestnut bark disease has probably existed in the neighborhood of Long Island for at least twenty years, slowly gaining headway in that time, but it was not called to public attention until 1904, and in the eight years that have since passed it has caused not less than twenty-five million dollars' loss of property. There was a time at its inception when this disease could undoubtedly have been controlled at relatively small expense, but the public lacked both the knowledge and inclination to do it. We lacked even knowledge of the existence of the disease, and there was no person whose business it was to be familiar with such diseases and on a lookout for them. You can readily figure for yourselves that the interest on a small fraction of twenty-five millions of dollars would have

paid the salary and expenses of many scientific workers whose efforts if applied at the right time, could probably have prevented the spread of such an epidemic as that which we are now considering. I have no hesitation in saying that if the chestnut bark disease had originated in a national forest where there was a co-öperating pathologist, it would have been put out like a forest fire, as a matter of routine, before it became extensive enough to be dangerous.

Cause and Symptoms.

The chestnut bark disease is caused by a fungus parasite known variously as *Diaporthe parasitica* Murrill, or *Valsonectria parasitica* (Murr.) Rehm. It is also considered by some investigators to belong to the genus Endothia. In other words, there is disagreement among mycologists as to the name of this fungus. For convenience, waiving the question of correctness, I will in this lecture use Murrill's original name, although this name has not been generally accepted by mycologists.

When any spores of this fungus gain entrance into a wound on any part of the trunk or limbs of a chestnut tree they commonly give rise to a concentrically spreading lesion, which soon girdles the tree. If the part attacked happens to be the trunk, the whole tree in consequence is killed, sometimes in a single season. If the smaller branches are attacked, only those portions beyond the point of attack are killed, and the remainder of the tree may survive for several years.

Some of the symptoms are quite prominent. Limbs with smooth bark attacked by the fungus soon show dead, somewhat discolored, sunken areas (occasionally with a raised margin), which continue to enlarge and soon become covered more or less thickly with yellow, orange, or reddish-brown spots about the size of a pinhead. These spots are the pustules of the fruiting fungus. Following a rain, or in damp situations, masses of summer spores are commonly extruded in the form of long, irregularly twisted strings or "horns," which are at first bright yellow to greenish yellow, or even buff, becoming darker with age. If the lesion is on the trunk or a large limb with very thick bark there is no obvious change in

the appearance of the bark itself, but the pustules show in the cracks and the bark often sounds hollow when tapped. After smooth-barked limbs or trunks are girdled the fungus continues to grow extensively through the bark, sometimes covering the entire surface with reddish-brown pustules. These pustules produce mostly winter spores (ascospores), although occasionally the long strings of summer spores (conidia) are also produced, even on bark that has been dead at least a year.

After a branch or trunk is girdled, the leaves above change color and sooner or later wither. Such branches have a very characteristic appearance and can hardly be mistaken for anything else, except in certain localties where the work of twig-girdling insects may produce a similar appearance in the spring. In case girdling by the fungus is completed late in the season, the leaves of the following spring assume a yellowish or pale appearance and do not develop to their full size. If the girdling is completed between spring and midsummer the leaves may attain their full size and then turn a somewhat characteristic reddish-brown color, which can easily be detected at a long distance. Later this leaf coloration changes to a more brownish tinge and the leaves are commonly persistent for a considerable time. The chestnut burs on a spring-girdled branch may or may not attain full size, according to whether the girdling by the disease was completed late or early in the spring. These burs commonly persist on the tree during the following winter, thus producing the only symptom which is at all conspicuous from a distance during the leafless season. The great damage which the disease has done in late summer thus becomes most evident at the beginning of the next season, and that done in the spring becomes evident later in the season, giving rise to the false but common idea that the fungus does its work at the time of year that the leaves change color, when in reality the harm was done much earlier.

Perhaps the most easily seen as well as the longest persistent symptom of the bark disease is the prompt development of sprouts, or "suckers," on the trunk of the tree and at its base, or somewhat less frequently on the smaller branches. Sprouts may appear below every girdling lesion on a tree, and there are usually many such lesions. These sprouts are usually very luxuriant and

quick growing, but rarely survive the second or third year, as they in turn are killed by the fungus. The age of the oldest living sprout, as determined by the number of its annual rings, is an indication of the minimum age of that portion of the infection immediately above it. This development of sprouts, sometimes continuing vigorously for at least five years after the death of a tree, affords clear evidence of the healthy condition of the roots.[1]

When the spores have once been carried to a healthy tree, they may develop in any sort of hole in the bark which is reasonably moist. These may be wounds or mechanical injuries, but by far the most common place of infection is a tunnel made by a borer. Borers' tunnels are moist, even in dry weather, and in them the spore finds surroundings favorable to its development. In many parts of the country where the disease is prevalent there is very direct evidence that insects are definitely associated in this way with 90 per cent or more of all cases of this disease.

The Species Affected.

So far as is now known, the bark disease is limited to the true chestnuts — that is, to the members of the genus Castanea. The American chestnut, the chinquapin, and the cultivated varieties of the European chestnut are all readily subject to the disease. Only the Japanese (15) and, according to the experience of Dr. Robert T. Morris (16), the Korean and Chinese varieties appear to show decided resistance. In spite of popular reports to the contrary, it can be quite positively stated that the bark disease is not now known to occur on the living portions of oaks, horse-chestnuts, beeches, or hickories. The golden-leaf chinquapin (*Castanopsis chrysophylla*) has shown under greenhouse conditions absolute resistance to inoculations. That *Diaporthe parasitica* may

[1] At this point the speaker introduced 40 lantern slides, descriptive of various phases of the chestnut bark disease. As it is impracticable to reproduce this portion of the lecture without figures, reference is made to publications already issued that contain illustrations of the disease (12, 13, 14), also to a forthcoming bulletin of the Bureau of Plant Industry.

develop characters which will enable it to attack trees outside the genus Castanea is not impossible, particularly if it is an imported fungus.

The Origin of the Disease.

The origin of the disease is unknown, and until more facts are determined, all views on this subject must remain mere hypotheses. My own working hypothesis is, that the parasite is an importation from some country other than North America. The resistance of the Japanese and Korean chestnuts, coupled with the fact that the Japanese chestnut has been extensively imported and grown in that part of the country whence the disease appears to have spread, suggests that eastern Asia may be the home of this parasite, as it is of the San José scale. (15) On the other hand, we must remember that the Japanese chestnut is also said to be resistant to the Marsonia leaf-spot, and to the "inky disease" of Europe. That the parasite has come from Europe seems less probable, in view of the fact that, according to Pantanelli (17) as well as according to my own inoculations under greenhouse conditions, the European chestnuts show no resistance to the disease. Still, a European or other extra-oriental origin is entirely possible, since any immigrating organism may be expected to change its habits and spread rapidly in the new country. The laws which have conditioned the rapid spread of imported organisms — weeds such as the Canada thistle and chicory, birds such as the English sparrow, insects such as the San José scale, gypsy and brown-tail moths, fungi such as the asparagus rust and potato blight — are little understood. But in view of the history of the spread and increased virulence of imported fungi in all parts of the world, it is not necessary to assume any recent adverse change in the environmental conditions of the American chestnut, such as winter injury or drought, in order to account for the spread of the chestnut bark disease. We have not found it necessary in order to account for past epidemics of plant disease, to assume that the American asparagus, the English gooseberries, the grapes of Europe, or the potatoes of practically the whole world, were suffering from winter injury, drought, or other unfavorable en-

vironmental conditions, in order to be susceptible respectively to the attacks of the asparagus rust, the American gooseberry mildew, the grape mildew, and the potato blight. There is enough difference in the normal climate of eastern North America and Europe to warrant marked changes in the behavior of any introduced organisms. Many vigorous European species of trees, for example, are a failure when introduced into the eastern United States, and have been for years.

The main fact in support of a foreign origin of the disease is its unquestionable spread in all directions from the vicinity of New York City. It is further suggestive that the oldest centers of infection located outside of the vicinity of New York City — Bedford County, Va., and Baltimore Co., Md. — contained chestnut orchards with Japanese chestnut trees, possibly also European varieties. If *Diaporthe parasitica* is a native fungus, or has evolved from a native saprophyte, it is necessary to assume that the saprophyte was very limited in range, or that the evolution to a condition of parasitism occurred in only one, or at most a very few localities, or that there is a chronological sequence in its evolution proportional to its distance from New York City. Any of these assumptions are a severe tax on the scientific imagination.

There are moreover striking indications that, as it spreads, the parasite is varying both morphologically and in its manner of working. The great divergence of views regarding many phases of the disease is largely due to the fact that different investigators are working under different conditions and in different localities. It is quite impossible from observations confined to one county or State to draw conclusions regarding the behavior of the disease over its entire range. There is hardly an observation to be made regarding the disease in any one locality which is not contradicted by observations in some other place. Now this variation is exactly what would be expected of any organism rapidly spreading into new territory.

However, before final conclusions can be drawn, it will be necessary to correctly name the fungus, and determine where, if anywhere, it is to be found outside of North America. At present it is not known to occur except in the United States, and does not appear to have been collected here prior to 1904.

The Parasitism of the Fungus.

Diaporthe parasitica is a virulent parasite. I have not yet, in making over six hundred inoculations, found any strain of the fungus that is not an active parasite. At the same time it is not a highly organized parasite, *i. e.* adapted exclusively to a parasitic mode of life, like the rusts for example: but grows readily as a saprophyte upon a considerable variety of culture media, and in nature upon the dead bark and wood of the trees that it has killed. By virtue of its moisture-loving character, it often occurs on stumps and at the base of trees, especially on the north side, and on roots which are partly out of the ground. This capacity for saprophytic life is shared by many of our most destructive parasitic fungi: a character which, as it permits growth on artificial culture media, has been of great service to plant pathologists.

The Relation of the Disease to the Condition of the Tree.

I have not been able to secure any definite evidence, experimental or otherwise, to show that a tree with vitality reduced from any cause is more susceptible to infection, or that the disease spreads more rapidly in such a tree, than in a perfectly healthy and well-nourished tree of either seedling or coppice growth, provided that such reduced vitality does not result in or is not accompanied by bark injuries through which spores can gain entrance. The dominant fact in the spread of the disease appears to be the parasitism of the fungus. Once inoculated into any variety of American or European chestnut, it soon girdles it, regardless of its condition, age, or previous history.

Winter injury may have caused the death of chestnut trees locally, especially of young sprout growth, but over the whole range of the chestnut, or over the present range of the bark disease, it is insignificant, so far as I can ascertain, as a cause of either injury or death. In so far as cracks or dead areas of bark or other wounds are produced through which the parasite can gain entrance, winter injury may predispose to the bark disease; but not other-

wise, so far as I have been able to determine. Similarly, if there is any drought effect that produces bark lesions, it would to that extent favor the bark disease. But in general, drought in summer hinders the spread of the bark disease by decreasing or even completely suppressing spore production. The behavior of the fungus in dry weather, particularly its growth on exposed roots and at the base of trees and stumps, especially when the latter are shaded by surrounding herbage, together with its dependence on moisture and rain for dissemination — all shows that it is distinctly a lover of moisture. A comparison of a small number of trees in the greenhouse grown under dry and moist conditions has shown no essential difference in the spread of the fungus in the trees after it had once gained foothold in the bark; on the other hand, spore production in the dry greenhouse was completely suppressed, and inoculations difficult to make without special precautions to insure moisture at the point of inoculation.

I therefore find myself in disagreement with the view that winter injury and drought injury stand in any appreciable causal relation to this disease (18, 19), for the following reasons:

(1) No evidence has yet been adduced to show that the winters in the past decade have been more severe, or the summers dryer, than in previous decades.

(2) Evidence is lacking to show that the chestnut has suffered from such injury more than any other native forest tree of the same or similar range.

(3) Weather conditions have varied locally, and neither winter injury nor drought injury has occurred to fruit trees, for example, over the whole range of the disease. In other words, neither winter injury nor drought conditions, nor both together, are coincident with the range of the bark disease. For example, no State has suffered more from winter injury to fruit trees in recent years than Michigan; yet the bark disease is not known to occur in that State.

(4) It is difficult to imagine any winter injury, especially if associated with drought, that would leave the roots in a perfectly healthy condition. Practically all trees killed by the bark disease sprout vigorously and repeatedly below the girdled point: this is indeed the most constant and conspicuous character of the disease.

It is difficult to see how such sprouting, particularly when it is repeated for several years, can be from injured roots. If the trees killed by the bark disease have first been weakened by winter injury or drought, it would appear that only the parts above ground were affected.

(5) On Long Island, for example, the following varieties of trees are commonly found in good condition, although growing side by side with dead chestnuts. Most of these have a more southern range than the chestnut or are exotic. All of them suffered in the cold winter of 1903–4, but they are now in good average condition, whereas there are few healthy chestnuts left on Long Island, and the great majority are dead. The trees referred to are such species as the persimmon, sweet gum, tulip tree, black jack oak, pin oak, pecan, *Paulownia tomentosa*, and several magnolias.

(6) The location of lesions on the tree-trunks or large branches bears, over the whole range of the disease, no constant relation either to exposure or to the points of the compass. Their orientation seems to be determined entirely by the location of the injury through which inoculation took place, which is very commonly a borer's tunnel.

(7) It is not necessary to assume any predisposing environmental effect on the host, since the disease kills vigorous growing trees of all ages that do not show the slightest signs of any sort of injury, either in appearance or increment. Young vigorous trees grown from imported seed under greenhouse conditions, and hence free from any possibility of winter or drought injury, have succumbed immediately to inoculation. In other words, the fungus alone is a sufficient cause.

Various theories have been advanced which have assumed weakness on the part of the chestnut due to coppicing. Whether coppicing weakens the tree or not is an open question. Coppice is perhaps particularly subject to infection from wood rotting fungi which consume the stump. Other species of trees, such as the oaks of England, appear to have been coppiced for centuries without any perceptible change of vigor; and in this connection, one cannot help thinking of the treatment that has been accorded to the mulberry, willow, and Lombardy poplar in Italy from antiquity, without any change in vigor so far as known. However, any

argument from one species to another is only an argument from analogy. The main fact to consider in the present connection is that we have no evidence that any weakness or loss of vitality predisposes the chestnut tree to the bark disease; nor any evidence that seedling trees are more resistant than coppice.

If weather or other environmental conditions have favored the disease at all, it is more reasonable to suppose that the effect is on the parasite rather than the host. On purely *a priori* grounds, it is not an unreasonable hypothesis that meteorological conditions might induce the development of parasitic characters in a saprophyte; but this again is pure hypothesis.

However, further research may be expected to reveal the facts regarding both origin and relation to environment. In any case, the origin of the disease is not a matter of practical moment, unless the parasite can be shown to be now evolving from a native saprophyte in many localities. The main things for the practical man to consider are that the disease is here; that it has been rapidly spreading for at least ten years, with no signs of stopping; that judging by the record of these years we definitely face the possibility of the commercial extinction of the chestnut; that judging by this same record the disease will spread farther and faster during the coming year than in any previous year; that we have the option of doing nothing or of attempting to control the disease; and that if any concerted action is to be taken it must be taken now or never.

The Control of the Disease.

We are handicapped at the outset by lack of knowledge. The damage already done by this disease is enough to warrant the most radical views of earlier years and radical action now; but, as a matter of fact, astonishing conservatism has prevailed regarding the seriousness and the contagious character of the disease. In consequence but few investigators have worked on the disease, the impression prevailing that it was due to weather conditions and would soon disappear naturally, and hence was not worth special attention. What experiments on control have been made were started too recently to give results that are dependable at this time.

All that they show conclusively is that cutting out advance infections delays the progress of the disease.

Cutting out advance infections. The bark disease does not spread in a solid line, like the advance of an army, but by scattered infections far ahead of the main body of diseased trees. These advance infections, which commonly consist of a single tree or small group of trees, become centers of local infection. It seemed probable, quite early in the study of this disease, that if these isolated trees which are infected in advance could be located at an early stage and destroyed, the spread of the disease from that particular source of infection would be stopped. Accordingly, owners of chestnut timber were advised to destroy completely those trees in their property which first showed signs of disease (12, 13, 20, 21). This has been done by many persons, and formal experiments along this line have been started in various localities (13). One of the most convincing experiments has been made nearby, at the Arnold Arboretum. By the destruction of five diseased trees some six or more acres of mixed chestnut timber have been kept free from disease. This work was begun by Mr. R. W. Curtis, with the coöperation of Prof. J. F. Collins, in the fall of 1909. Obviously, however, this method will not prevent reinfection from distant sources; and general sanitary knowledge and common-sense suggest that in order to be efficient, this method must be employed by all property owners over a large area. But such unanimity of action means State control, and so far only one State has undertaken such control, namely Pennsylvania (13, 21). The vigorous and progressive action of this State makes it certain that the method of cutting out advance infections will be tested on a sufficiently extensive scale to demonstrate what its practical value may be. Obviously, however, if Pennsylvania is not joined in this effort by New York, Maryland, West Virginia, and Ohio, the work will be a great experiment, but not finally effective. Such an experiment will, however, be worth all the money that will be spent on it, whether the results are positive or negative. No merely academic experiment, nor one on any smaller scale could be finally convincing. We may be sure that this is not the last epidemic disease to appear on American forest trees, and all that we learn from this, both of science and practice, will be useful later.

It is unfortunate that the disease is advancing so fast that we are not warranted in waiting one or more years to continue experiments on a small scale and so secure more exact knowledge regarding many phases of the disease. But if we delay even a year it will be too late to use the cutting out method in regions now becoming diseased, for *this method is impracticable except in dealing with advance infections.* This is one reason why the cutting out work in the neighborhood of New York failed. The danger is that even in progressive Pennsylvania the work may have been started too late; and work in western New York, Ohio, and West Virginia probably should have begun last summer. Last spring we thought that here in Massachusetts there were only four stations of the disease; but Prof. Arthur H. Graves' survey in the summer showed the southwest half of the State to be already too thoroughly infected to make state-wide efforts at control advisable (13, 22).

Inspection of chestnut nursery stock. Diseased chestnut nursery stock has been a most important factor in the spread of the bark disease. If all such stock can be located and destroyed, the spread of the disease can to this extent be prevented. Fortunately laws are already operative in practically all States requiring the inspection of nursery stock.

Utilization of dead and dying trees. This is a forestry problem of the utmost importance (20, 23). In the neighborhood of New York City all chestnut trees are dead; as we go from there in any direction we find areas of dead trees, corresponding to old points of advance infection, surrounded by infected and dying trees. Between these areas are occasional *insulae* of trees still healthy. But the number of trees that must be immediately utilized is enormous, and will increase annually. They must be utilized to save the timber, to reduce infection, and to prevent the starting of insect epidemics, such as have been known to result when large numbers of trees have been killed by fire, for example. It has been suggested that a discrimination in freight rates in favor of chestnut for a certain time would enable chestnut products particularly poles and ties to be used in place of other species. Unless some such plan can be brought about it is difficult to see how a great glut in the market for chestnut products can be avoided.

Improvement in forest management. The scouting work on the

bark disease in at least two States has been made the occasion for a general forest survey. Everywhere it will prove the occasion for more careful management of the surviving trees. In localities where the chestnut is already past saving, this species must be discriminated against (13). While change of management of chestnut woodland may not affect the course of the disease, except in so far as it involves cutting out, constructive forestry is bound to be stimulated by the work done on this disease. Methods of control of this and other forest diseases which are visionary now will be in daily use in twenty years. We do not realize how rapidly forestry in the Eastern States is becoming as intensive as that of Europe.

Tree surgery. Extensive experiments, performed mostly by Prof. J. F. Collins (12, 13), indicate that the life of small ornamental and orchard chestnuts can at least be prolonged by a cutting out system somewhat similar to that used in the control of pear-blight (3, 4). No such experiments have proved successful, however, when performed on large thick-barked ornamental trees, mainly on account of the difficulty of detecting small lesions in the thick bark.

Tree medication. The possibility of controlling disease in trees by special fertilization (24) or by direct chemotherapy (25, 26) — the introduction of chemicals or immunizing substances directly into the tree — has long been a fascinating ideal, but so far rather barren of results. The method has been discredited by the number of fake remedies which are supposed to be applied in this way. Nevertheless, the basal idea is fundamentally sound. It is interesting to know that Dr. Caroline Rumbold, one of the investigators in the employ of the Pennsylvania Chestnut Tree Blight Commission, is making extensive experiments along this general line. From her work very valuable scientfic results are to be expected, whether the method ever becomes a practical success or not.

Breeding resistant trees. The resistance of the Japanese and Korean chestnuts suggests that if resistant individuals of these species were crossed with the American and European chestnuts, hybrids might be produced with the desirable nut characters of one parent and the resistance of the other. So far no resistant individuals of the American chestnut have been found. Trees

of both American and Asiatic species of the genus Castanopsis could probably also be used as resistant parents. Resistant timber trees as well as nut trees could be produced. Many experiments along this line are already in progress. In the long run the results of breeding will probably be the most profitable outcome of the struggle against the bark disease. Sooner or later we must begin to breed forest trees systematically, and the chestnut is on many accounts a good tree to start with.

The Outlook.

The chestnut bark disease is now known to be distributed throughout an area bounded by the following lines: from Boston through southwestern Vermont to Lake George, southwest to about Pittsburgh, south to near the southern point of West Virginia, thence eastward to Chesapeake Bay. Probably advance infections occur outside this area, but so far none have been reported. During the coming year the disease may be expected to spread more extensively than in any previous year of its history, especially if the summer is moist.

It is to be hoped that some concerted effort will be made to combat the disease. Whether States which now do little or nothing in general forestry will make any serious effort to save this one species of tree remains to be seen, and for legal reasons the National Government cannot undertake any work that involves the condemnation and destruction of private property. I know of no case where a plant disease once prevalent has ever entirely disappeared, though like peach yellows and pear blight and insect epidemics, it may occur in waves. It is to be hoped that this disease will prove the exception to the rule, and disappear from some natural cause. But no such cause is now apparent; and it is much more probable that the disease will, like peach yellows and pear blight which were with us in the 18th century, never entirely disappear except where it exterminates its host, or where it is controlled by human agency. But unless methods of control that we cannot now imagine are devised, no time will come when it can be more easily controlled than at present. Yet we must

remember, that with the increase in value of timber, and the development of intensive forestry in the Eastern States, methods now impracticable for controlling this and other diseases will come into regular use.

The Immediate Program.

We now come to the great question: What are we going to do about it now? Obviously three courses lie open before us; First, do nothing. There is much precedent for this, and some scientific authority. The result of this plan will be the loss of the chestnut trees, and no increase of knowledge. Second, conduct fundamental scientific investigations on the disease. This procedure is necessary and must be done at any cost. I think there is no disagreement as to the propriety and necessity of this. But investigation alone will not control the disease, since there is not sufficient time left in which to perform the necessary experiments and apply the results. So this plan would only result in increase of knowledge, applicable only to future epidemics. Third, conduct investigations and endeavor to find out all we can about the disease, particularly possible methods of control, and at the same time combat the disease by any and all methods whatsoever that we have at hand. Since up till now the only method that has been proposed is the cutting out of advance infections, this will mean that this method must be used until some other one is discovered or proposed; but every method that holds out the least hope of controlling the disease must be given a fair trial.

We must not close our eyes to the fact that we have no guarantee of the ultimate success of the cutting out method. But it may at least hold the disease *in statu quo* until some better method is devised, or until it is demonstrated that all methods are futile. We may be certain that the problem is intrinsically no more difficult than the one you have faced in this State, namely, the control of the gypsy and brown-tail moths. I have heard your critics say that in this work your methods are visionary and impractical; that it is a continuous and losing fight; that there was no chance of success from the start. But I know that the majority of people

both in this State and in the States that have been protected by the work you have done, indorse your work and will see that it is continued. When have we ever undertaken to control an epidemic of any sort with any previous assurance of success? The boll-weevil is still doing business at the old stand, and extending his range year by year; but does anyone question the wisdom of trying to control the boll-weevil? Out of this work has come untold good to Southern agriculture.

Next week, in Harrisburg, Pa., will be held an interstate convention to consider what shall be done about the chestnut bark disease. We may hope that the convention will be adequately attended by both practical and scientific men, and that the difficulties and dangers, as well as the urgency and necessity of an aggressive campaign will be adequately presented. We can afford to abide by the decision of this convention.

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Discussion.

Ralph W. Curtis of the Arnold Arboretum was asked to give his experience with the chestnut bark disease in the Arboretum. He exhibited specimens of branches affected and said that he simply brought in these specimens thinking that some one might like to see the disease fresh from the field. The branch was cut from the top of a young tree about fifteen feet high showing the leader entirely killed by the disease, and also a side branch girdled during the past summer on which the dried leaves were still hanging. He said this shriveling of the leaves was a great help in locating the disease.

Mr. Curtis said further that the shriveling is due to the girdling of the branch and the girdling may be done by the disease or by something else. A boring insect may girdle a branch and produce the same effect or the branch may have simply been broken; but in any case it is worth investigating; it might be the disease.

Dr. Metcalf has said that the production of suckers just below the point of attack is a constant feature of the chestnut bark disease. This is exactly the case with the specimen in hand. Just below the infected area on the stem the tree has thrown up a strong, vigorous sucker during the past summer in an effort to replace the top killed by the disease last winter. The two sections of wood cut from the stem show that the disease spreads just as Dr. Metcalf explained in his lecture. The leader was already dead last winter and did not bud out last season. When the warm moist days of spring came the diseased area at the base of the leader commenced to push out millions of spores through the small eruptions or pustules in the bark. These were washed down by the rains spreading the disease into any break in the bark that they reached. These

two infections on the two sections taken from the stem were the only breaks in the bark found by the spores last summer. They show very well the characteristic appearance of the bark at this early stage of the disease.

At the top of the tree where the disease is older the bark is sunken and reddish-brown in color and broken up by the pustules or small eruptions from which the spores escape; but on the two later infections of the trunk started last summer by the washing down of the spores the bark is not yet sunken, is of a dull orange or flame color, and has not pushed up pustules. If these diseased places are cut into with a knife the dark brown part shows the dead bark and the light brown part the mycelium of the fungus itself. This part filled with the mycelium of the fungus is practically the same as the "spawn" we buy for our mushroom beds. A small bit of it transferred to a break in the bark of a healthy chestnut tree will produce the chestnut bark disease. Rains wash the disease down the trunk of an infected tree but woodpeckers, squirrels, and insects are the chief means of carrying the disease from one tree to another.

Following a question which Dr. Metcalf answered regarding the difficulty of detecting the disease, Mr. Curtis stated that there are bulletins published by Dr. Metcalf and also recently by Prof. Rane, the State Forester, containing excellent photographs of various stages of the disease. These can be had for the asking and are a great help in detecting the disease.

The question was asked, "How is Mr. Curtis fighting the disease in the Arboretum?

Mr. Curtis replied, "The first thing is to become familiar with the disease. Our first case was discovered in December, 1909. I do not say that this was the first authentic case in Massachusetts but it was the first case in this part of the State. Fortunately this was only a few days before the Boston Meeting of the American Association for the Advancement of Science. Dr. Metcalf was present at this meeting and took some of our material for examination. As soon as the disease was definitely determined, we notified Prof. Rane, the State Forester, Mr. Pettigrew, the Boston Park Superintendent, the several Metropolitan Park Superintendents, and all others whom we thought might be interested in the disease.

Our first infected tree was left standing until March and then cut out below ground and burned. The tree was a small one about fifteen feet high. It stood in a twenty acre mixed plantation about one-fifth of which is chestnut. Mr. Collins who is Dr. Metcalf's associate in this chestnut disease work examined the first tree before it was cut out and has since made frequent inspections and has kept a careful record of all cases with the circumstances attending each.

The following summer a second case developed about one hundred yards from the original infection. This was promptly cut out and burned in the same manner. A suspicious looking clump of chestnut sucker growth was also disposed of in the same way. This had sprung up from the stump of a tree which had been thinned out the year previous in the same general location. This week a third and fourth case have appeared. The third case was also about one hundred yards from the first tree infected but in an opposite direction. This makes three cases in three seasons in a twenty acre plantation, one-fifth chestnut. This does not look so bad and if we do not succeed in keeping it out entirely we may hope, at least, as Dr. Metcalf has said, to greatly retard its action.

The fourth case we regard more seriously because it developed on one of our large trees in the regular chestnut group, one-half mile distant from the other cases on the mixed plantation. Fortunately the infection occurred only on a side limb twenty feet from the ground. The point of infection was three feet out from the main stem and no other signs of the disease could be found on any other part of the tree or on any of the other trees in the group. The infected limb was cut out and burned as soon as discovered.

All the diseased parts of the third case in the mixed plantation are here on the table. After this afternoon's discussion with the aid of the publications suggested and the fresh material at hand showing one and two year cankers in winter condition no one should have much difficulty in locating the chestnut bark disease.

The first step, as I have said, is to get familiar with the disease. Everyone connected with the Arboretum knows what the disease is and is watching for it all the time.

The second thing is to make a thorough inspection of all chestnut growths old or young. One canker discovered now will be equiva-

lent to destroying millions of spores next summer. The work of a small bark-mining insect may oftentimes be mistaken for the first development of the bark disease. If this or any other signs are confusing I would advise you to do as I did and send them in at once to some one familiar with the disease. Prof. Rane, the State Forester, has his office at 6 Beacon Street and Mr. Rich can be reached here at Horticultural Hall. If the trouble is so located that it is not possible to cut it off and send it in I would certainly take advantage of Prof. Rane's offer to send some one to make an examination.

The third and last step is to cut out all signs of the disease, root and branch. If the infection occurs on the main stem no matter whether the tree is large or small, open around the base with a grub and cut it out below ground and send it to the fire at once. If the infection is local on a side branch and has not reached the main trunk it will be sufficient to remove this branch taking care not to handle the diseased part.

If for several reasons the tree is a very valuable one and you do not want to cut it out it may be possible to save it where the infections are few and small even though they appear on the main stem if Dr. Metcalf's directions are followed carefully. We have not had any such cases yet but we are willing to give the treatment a trial should such a case arise.

The treatment recommended by Dr. Metcalf is simply this. Remove the canker by cutting around it, always doing the cutting in the healthy green bark two inches from the margin of the canker which is shown by the line of discoloration. Make the cut one inch deep into the wood for although this is a bark disease it may extend into the wood somewhat. Leave no chips about the tree and paint the wound carefully with tar. Inspect the cuts frequently during the spring to make sure that all the disease has been removed.

In general I may add that the only preventive treatment we can depend on at present to combat the chestnut bark disease is cleanliness. Insist on proper sanitary conditions in all the operations about your chestnut grove. Have your trees gone over and pruned carefully by men whom you can depend upon. When I say men whom you can depend upon I mean exactly what I say. It will pay you to take time to find such men.

It is just as foolish to call in a butcher for a case of appendicitis or a cement worker to fill a cavity in a tooth as to allow any sort of man to prune your trees and cut and saw with no regard for or knowledge of the simplest laws of tree growth. A man may call himself a tree surgeon or a tree expert or what not, but that is no reason why one should disregard the ordinary rules of common-sense and let him do anything he wants to with your trees without at least asking him first for a satisfactory recommendation from some one you know is competent to judge.

I see so much rottenness and injury resulting from careless and ignorant pruning and so many trees through the city badly treated and so many more absolutely neglected that I cannot but feel strongly on this whole question of the proper care of our trees, and when I say that the only remedy we have at present for the chestnut bark disease is proper sanitary conditions I mean that the disease is one we cannot cure directly and therefore we must fall back upon prevention.

Have the trees pruned thoroughly, taking particular pains to remove all broken parts, cut off all dead stubs even when they are not more than one-half inch across, clean out all borer holes, examine all old cuts and chisel them out if necessary until nothing but sound wood is left and then paint everything with some good heavy paint like tar. There is nothing wonderful about this except the amount of such work that one trustworthy man can find on one chestnut tree. When the work in the trees is done pick up all the brush and rake the ground carefully and see that all the refuse is put on the fire.

If your trees have not been cared for in this way before you will be surprised at the amount of attention that they need. But having made this good start at last, don't make the common mistake of thinking that they will need no attention the next year. Take Dr. Metcalf's advice on this point. In his lecture following his criticism of the foolishness of elaborate tree surgery operations he said that it is the man who goes over his trees once a year with his pot of tar and creosote who will have sound and healthy trees twenty years from now. If you take this good advice you will never regret it and you will be doing all that any man can do at present to fight the chestnut bark disease."

Edward R. Farrar asked if there was any record of this disease in Europe. Dr. Metcalf replied that the origin of the disease was entirely unknown and we do not know where it came from. There are several theories regarding its origin, one of which is that it was imported into this country on the Japanese chestnut. It is possible that it may have developed from a weaker form, but the whole matter is at present only one of conjecture.

The question was asked as to how prevalent the disease was in the immediate vicinity of Boston.

Dr. Metcalf answered that it was not very prevalent hereabouts and that the only cases known were those reported by Mr. Curtis.

Prof. F. W. Rane remarked that the disease was pretty well distributed all over Massachusetts. He had spent the past week in the western part of the state studying the conditions in various places and while the disease had been noticed occasionally he did not feel that there was occasion at present for undue alarm.

Prof. Rane called attention to the recent Bulletin on the chestnut bark disease in this state issued from the State Forester's office which could be obtained by anyone interested. He also offered the assistance of his office to all having woodlands containing chestnut trees and stated that there was no possible excuse for ignorance on the subject.

A YEAR'S VEGETABLE SUPPLY FROM THE HOME GARDEN.

By William N. Craig, North Easton, Mass.

Delivered before the Society, February 24, 1912.

Horticulture has its full share in the ceaseless activity of the present age. Changes in the vegetable garden, the varieties grown, and methods of culture show just as great changes as are to be witnessed in the present improved methods of locomotion, lighting, or sanitation. There have been, within the last twenty-five years, particularly striking improvements in potatoes, peas, tomatoes, beans, and in fact, all our standard vegetables. They are to be seen in our markets in greater variety, of better quality, earlier and later than previous generations thought at all possible. There are now practically no periods in the year, even in midwinter, when a good assortment of vegetables, either of greenhouse or Southern outdoor culture, is not obtainable. The average consumption of meats per head of our population is needlessly high; there are tens of thousands of families whose pocketbooks would be heavier, and health better, if they used more vegetables and fruits, and cut their meat supply in half.

We hear much nowadays of trusts, and the high cost of living is dwelt on, not only here, but in practically every civilized community on earth, and our President is suggesting an international tribunal to consider the causes of high prices and suggest remedies. Perhaps the most practical remedy which could suggest itself would be for more families to plant fruits and vegetables in their home gardens. The European countries are far in advance of us in this respect; there, every workingman who has the least ambition, rents a piece of ground if he has none attached to his home, and grows a fine variety of vegetables; in England, large numbers of workmen even have small greenhouses in their gardens, in which

to grow a few flowers and early vegetables, and start their seedlings in. It should be possible for many to have modest greenhouses here; they need not necessarily be heated through the winter, but utilized for starting early plants for the home garden, both flowers and vegetables. Where a greenhouse is not possible, it does not cost much to have a cold frame with two or more sashes, which can be used as hot-beds for starting tomatoes, celery, lettuce, egg plants, cabbages, and other plants. It is simply astounding that so many residents in these United States prefer to buy their vegetables the year through, when they, in many cases, have facilities for raising the same at home. Take the city of Boston and its suburbs as an example, and what a wretchedly small portion of the residents who have homes trouble to grow even a few of the most necessary vegetables. We see many fine homes with their lawns and shrubs, veritable Queen Anne fronts, but too often, alas! what we might say, Mary Anne backs. For it is too true that beyond collections of junk, ashes, and other rubbish, what might be in many cases a garden of utility is only an eyesore.

The soil right here in Massachusetts may not appear so rich as in our prairie states; it contains more rock and also a lot of gravel, but there are few soils which will not with a little coaxing grow creditable crops, and there is no earthly reason why thousands of persons of moderate means should not raise practically all the vegetables needed for themselves and families, if they would but utilize land which is now practically made no use of. There is no more practical way to reduce the cost of living than to grow fresh vegetables in the home garden, and one of the best ways to encourage the rising generation to improve on present day methods is to interest them while of tender years, in the home or the school garden movement. It would also be philanthropy of the best type if, in the vicinity of many of our towns and cities, blocks of land could be rented for a moderate sum to working men, who might desire to grow vegetable crops. These latter allotments are a feature in Europe where intensive culture is more practised and necessary than here. It would be an excellent innovation here and would be welcomed by thousands of European settlers, who mourn the absence of anything in the nature of such gardens.

Vegetable gardens should always, if possible, be made where they

can get a warm, sunny exposure; if sloping south the crops will be earlier, but this is not essential. Very stiff land of a clayey nature can be improved by additions of street scrapings, sand, fine gravel or fine coal ashes. Vegetables will grow well in almost any soil in which water does not stand. Such soils require drainage to produce good crops; drainage warms as well as sweetens the soil. The best manure for nearly all vegetables is well rotted cow or horse manure, if applied and worked in. In the fall fresh manure can be used to advantage, but it is better not to use such when near planting time. It is always well to save and bury as much of the humus or vegetable matter as possible; too often this is thrown on the rubbish heap.

In considering any general order for work for the vegetable garden the leading principle should be that its productive powers should be taxed fully. There need be no resting of the ground and it is very easy if there should, perchance, be a surplus of any crops to sell them, to give them away, and in case of the Brassica family to return them to the soil for manure. Hard cropping of course is not possible unless the land is liberally manured and the surface soil kept constantly tilled. To put little in and take off much means virtual exhaustion; a whip will not work as a substitute for corn for a horse with hard work to do; nor will a candle burn long if lit at both ends. Always dig deeply, and when occasion will permit trench a couple of spits deep. Change crops from year to year where this can be done; this is not absolutely necessary and it is not always possible to do it, but the majority of vegetables do better with a change of ground.

Soils which are sour or acidy should have a liberal dressing of lime; this is best applied in the fall after the crops have been gathered. Sufficient lime is not used in New England; once in three years the bulk of soils are benefited by an application; do not apply the lime, however, at the same time as manure, as the lime will release much of the nitrogen from the latter. Barnyard manure cannot always be procured, but good crops can be produced, with chemical fertilizers alone; these, however, must be used with greater precaution than the manure. Too often fertilizer is used in seed drills and the seedmen are blamed for selling poor seed, where the seedlings have been practically destroyed by the ferti-

lizer; the safer plan is to broadcast and harrow it in well, also to use it between rows of growing crops to stimulate them.

A list of vegetables of proved excellence and a few words on their culture is apt to be tedious, but there are so many starting a garden each year that something must be said on this subject. These remarks are intended rather for small growers, and not for those who are operating market gardens. We have some of the most up-to-date market growers in America in the vicinity of Boston, and until fifteen years ago their exhibits at the shows of the Massachusetts Horticultural Society swept the decks; of late years, however, first Worcester and more recently Taunton and North Easton have taken the lion's share of the premiums; particularly was this the case at the big vegetable show last September. We hope the farmers of Revere, Belmont and Arlington will wake up and recover their lost laurels. The best growers of vegetables are not necessarily market growers or practical gardeners at all. In Great Britain much finer leeks, potatoes, celery, and cauliflower are grown by the artisan classes, who take a keen interest in vegetable culture, than by the professionals, and there is no reason why it cannot be accomplished here.

Peas are one of the important vegetables in New England, and the first sowing should be put into the ground as soon after it is open as possible. We hear it commonly stated that it is too early to sow peas because the ground has not become warmed. The warmer and drier the soil gets the poorer will peas do. We have sown these as early as March 10 and in late seasons not until the first week of April; but just as soon as the frost has left the ground it should be spaded and plowed, manured liberally, and a first sowing made; successional sowings can be made until the end of May, after which time it does not pay to sow them, but for a fall crop a sowing can be made about July 25. Dwarf peas are to be recommended for small gardens; probably the best of these is Sutton's Excelsior; Nott's Excelsior is very good also; both these are heavy croppers. Later varieties, such as Thomas Laxton, and Gradus, are excellent but should have good supports. Birch brush is the best support for peas; wire netting may be used where birch is not procurable. Good succession peas to follow those already named are Alderman, Dwarf Champion, Sutton's Dwarf

Defiance, Juno, Improved Stratagem, Advancer, and the old Champion of England; the latter should not be grown where it cannot be given good supports, being a tall grower, but it is a very productive variety.

Beans are of much easier culture than peas and will succeed in soils where peas would be an utter failure; they can also be picked over quite a long season; we have picked string beans as early as June 28 and last year as late as October 12, which gives a fairly long season. First sowings of string beans can be made from April 20 to 25, and successional sowings made until August 1st for late pickings. Triumph of the Frames and Plentiful are the earliest varieties we have grown. Stringless Green Pod and Valentine are excellent later sorts. Improved Goddard and Dwarf Horticultural are splendid string and shell varieties. Wax beans are handsome and sell well; their appearance helps them to sell, but their flavor is far inferior to that of the green podded sorts. Rustless golden wax and stringless white wax are reliable varieties. Lima beans should not be sown until we get settled warm weather. The dwarf varieties are of comparatively recent introduction, and for the small grower are far to be preferred to the pole sorts. The earliest of these is the small Henderson Bush Lima; many prefer the flavor of this to all others; it is hardier than the other varieties, such as Burpee's and Dreer's, and a marvelous producer. Dreer's Lima is a sure cropper in wet seasons but inferior in flavor to Burpee's. Fordhook Lima is superior to the Burpee's in both size and flavor and will eventually supersede it.

Where poles are procurable the following are fine beans to grow: Kentucky Wonder and Lazy Wife's for Snap; and Golden Cluster is a good wax variety. The old Scarlet Runner makes long rough beans which, however, are of excellent flavor, and the plants are very ornamental, while in flower. The Sieva or small Lima and King of the Garden Lima are the best of their kind, and produce an enormous quantity of pods per pole. The best wood for poles is cedar or hickory, these last for several years, while oak, birch, and maple don't generally carry for more than one season.

Potatoes are the most important of all garden vegetable crops. They will succeed in a great variety of soils, if proper preparation of manuring has been given, but the best soil is a deep, rich, friable

loam, well drained, where there is no possibility of water standing in a wet season. Far more owners of gardens should grow their own potatoes; they cost the average household more money than any other vegetable, and there is nothing difficult in their culture which should deter anyone from planting them. Fresh manure should never be used when planting potatoes; it can, however, be worked into the soil the previous fall; the best plan is to plant them to follow some crop for which the ground was heavily manured the previous spring. Early planting pays the best, particularly so when we get such severe droughts as in the summer of 1911. Rows three feet apart and sets fifteen inches are correct distances. For a very early crop it pays to sprout a few tubers in boxes containing a single thickness of each, stood erect and as close as they can be packed. The general practice is to spread fertilizer in the drills before planting the sets; a far better plan is to broadcast it after the potatoes have been planted. Where fertilizer alone is used 600 lbs. acid phosphate, 500 lbs. kainit, and 200 lbs. nitrate of soda per acre can be applied, using the nitrate of soda after the growth has started. Small growers had better use some special potato fertilizer.

Differences of opinion arise about cutting sets; we like them to have two eyes each, and such sets from large potatoes are more productive than if cut from small ones. Single potatoes of small size do not average so well as sets cut from large potatoes. The ground should be kept constantly stirred, both before and after the potatoes start to grow, and this must be done very persistently, and particularly after each rainfall. The potato beetle and blight can be controlled by spraying; for the former, arsenate of lead, at the rate of four pounds to fifty gallons of water, with bordeaux mixture added as a fungicide, applied as soon as the young bugs hatch out, will care for the pests if well sprayed and dried on before rain. One application of poison should suffice, but a second and even a third spraying with the bordeaux mixture will ensure a healthy foliage. As to varieties, Early Norwood and New Queen as earlies and Green Mountain as a main crop variety are sufficient. If restricted to one variety it would be the reliable Green Mountain.

Miscellaneous root crops want similar soil and conditions to

potatoes to ensure roots free from scab; also lime should not be applied to the land the same season. A few reliable varieties of these to grow are Early Horn and Danvers Half-long carrots, Market Model parsnips, Egyptian and Edmand's Early beets, Sandwich Island salsify, and Early White Egg and Budlong turnips. The turnips, and in fact all root crops do particularly well on sandy ground. These and potatoes should be stored in a frost-proof cellar where no fire heat is used. Some of the parsnips can be left in the ground until spring; the most severe frost will not harm them, and it is surprising how small a patch of each will supply a whole family for a season.

The Brassica or cabbage family cannot be omitted from any vegetable garden; all like well-manured land. Excellent cabbages for early are Copenhagen Market and Jersey Wakefield; for late, Danish Ballhead and Danish Roundhead; these latter are harder and far superior to the Drumhead types. Early cabbage can be started in a frame in March and planted out about April 20. Winter sorts should be sown about June 1. Cauliflowers for an early crop are best grown in a cold frame where they can be watered. For a fall crop seed should be sown as near May 25 as possible. Kronk's Perfection Erfurt for early, Dry Weather and Snowball for late, are splendid varieties to grow. Brussels sprouts should be sown as soon as the ground is open, and later planted out in rows three feet apart, and two feet between the plants. These are splendid and choice winter vegetables; with the cabbages they should be lifted and heeled in a cool cellar before the frost becomes too severe. Aigburth is a first class sort, so is Dobbie's Selected. Savoy cabbage is preferred by some to the common cabbage; the culture is the same and the Drumhead variety is the best. Green curled kale or borecole, is a very hardy member of the Brassica family, and of very easy culture; heeled in with the cabbages it can be used from February to the last of April, and is superior to the greens brought from the south. It should not be housed until it has had several good freezings.

No garden is complete without tomatoes. These are easily raised in the house or cold frame, and if strong plants are set out fruit may be picked by the middle of July and until killing frost. To secure good tomatoes they should not be allowed to ramble over

the ground at liberty, but trained to stakes, fences, or some other support. We prefer to retain two of the bottom laterals, with the main stems, and to rub off all other laterals, also cutting back some of the leaves, especially when the plants are tied up to stakes. Trained plants have many advantages to compensate us for the care bestowed on them. The fruit is always clean, and readily seen when wanted, ripens better, and has a superior flavor to those borne on plants which are bespattered with soil after every rainfall. Excellent early tomatoes are Chalk's Early Jewel and Lister's Prolific. For a main crop, nothing is superior to the old reliable Stone. Aristocrat and Dwarf Stone are fine dwarf types, excellent for very small gardens. Golden Queen is the finest of the large yellow varieties. The small fruited tomatoes have of late years come greatly to the fore; for salads, decorative effects, and preserving they are very fine; the finest of these is Yellow Plum; others to be recommended are Red Cherry, Peach, Pear, and Red Plum. They grow taller than the large-fruited tomatoes; we have had Yellow Plum over twelve feet high, and one or two plants of each of these varieties will give a lot of fruit.

No garden is complete without sweet corn; no vegetable withstands severe drought and heat better if persistent culture is given the crop. It succeeds well in either hills or drills, probably in the latter the stalks do not blow over so much during wet windy weather. A first sowing can be made in a warm piece of ground from April 25 to May 1st; even if it is cut down by a late frost the seed is easily sown again and the loss is but trifling. The soil for sweet corn should be very rich for best results. Seeds can be sown at intervals of eight or ten days until July 1st, in the case of Stowell's Evergreen, and a few days later with Crosby. We have sown early varieties as late as July 15th and they have yielded an abundant supply of cobs when frost held off late. In the way of early varieties, First Crop Sugar, Golden Bantam, Early Cory, and Peep-o-day, are all good; in medium earlies we have Golden Dawn, an excellent yellow variety of fine flavor, and the always reliable Crosby; Potter's Excellent is another sort of splendid flavor; of late varieties, Stowell's Evergreen produces the largest cobs, and they are very tender and sweet, but Country Gentleman, an irregular rowed variety, has a very delicate flavor.

The weather should become warm and settled before squashes are planted, and the soil for them must be well manured. Summer Crookneck and Bush Scallop are good early varieties. Orange Marrow is a superior fall variety and Hubbard is the standard winter sort. Golden Hubbard is also good as are the Delicious and Marblehead, the latter keeping very late. It is always well to sow a good number of seeds in a hill to avoid probable destruction of many by insects. For the small black fly dust the foliage with lime, soot, or ashes, while they are damp. It is also a good plan to sow a few radish seeds in each hill; the insects seem to eat these with avidity and spare the squashes; the same dusting will keep away the striped squash bug, but several applications may be necessary. The squash vine borer is a very destructive pest; very thorough cultivation before planting will kill many of these grubs, which live in the soil, and work their way into the stalks of the plants. Sometimes before the shoots are too wilted, the stem can be slit, the borer discovered and destroyed, the cut part covered in the soil, and the shoot regenerated; when badly wilted it is best to pull up and bury the stems.

Vegetable Marrows are easily grown and are very free fruiting squashes, being especially good for summer and fall use, also for preserving. The borers rarely attack this variety, nor do they trouble pumpkins very much; of these latter Sugar and Nantucket are splendid winter varieties for pies. To secure pumpkins of the largest size, which are more curious than useful, dig a large hole and fill with manure, reduce the plants to one in each hill and thin out the shoots, also pinch back the long laterals, and allow only one fruit to a plant. The variety Mammoth is the best to grow for this purpose; very large squashes can be grown in this way.

The culture of cucumbers is similar to that of squashes and an early crop can be secured in a frame, or plants may be started in pots and planted out in hills, early in June. The Arlington White Spine is a good variety. Melons are not really a vegetable at all but are served only as dessert fruit. They are, however, always catalogued with other vegetables, and may therefore be fairly spoken of here. During the past few years these, thanks to warm summers, have done extraordinarily well. Early batches can be

started in pots or under small handlights; a sheet of glass 16 × 24 over each hill will also advance the crop quite a little; these glasses should be removed when rain falls, closed on cold nights, and tilted during the day. It is not a good plan to merely dig out a hole and place a shovel full or two of manure in each hole, giving nothing to the rest of the ground. A better plan is to broadcast it and plough or spade it in; this gives more vigorous plants. The finest flavored melon we have grown is Honey Drop; other good sorts are Early Christiana and Emerald Gem. Rockyford is a great cropper but we have found the skin rots rather badly just before ripening. The same applies to the big handsome Montreal Market.

Watermelons do well in warm summers; they should not be sown before June 1, and one or two plants only should be left to a hill. Cole's Early, Early Fordhook, Halbert Honey, and Kleckley Sweet all do well in Massachusetts. Many persons cannot tell when watermelons are ripe. One sign is that the little tendril where the stem of the fruit is attached to the vine withers; green fruits sound solid, ripe ones more hollow; the fruit will also "give" a little when firmly pressed, if it is approaching ripeness.

Celery is a very important vegetable for fall and winter use. It will grow well on level ground and is thus planted by market growers; but in trenches it makes its finest possible growth. Advantages of trench culture are that water is more easily applied, the plants are more readily hilled up, and the trenches give shade to the plants in hot weather. An abundance of well-rotted manure should be placed in the trenches, as celery is a gross feeder. Golden Self Blanching is the finest early variety; Golden Rose is also good; White Plume is handsome, but of coarse texture. Good winter sorts are White Queen, Giant Pascal, and Boston Market. The richest and most mellow soils should be used for celery culture. Early varieties may be bleached by means of boards, but the later sorts must be hilled up by degrees, and housed in a cool, frost-proof cellar before weather becomes too severe. It must also be aired on all favorable occasions. For celery blight pick off the worst leaves and spray with Bordeaux mixture. Hollow stalk is caused by an insufficiency of moisture at the roots during the growing season. In lifting celery the earth should be moist; if

not, apply some water after planting in the frame or cellar, and always take a nice ball of earth with each plant.

Onions are one of the most popular of vegetables and it is not difficult for the small grower to produce an all the year round supply on a small piece of ground. The ground can hardly be made too rich: cow manure, with some soot added, is extra good as a fertilizer. The ground must be prepared and the seed planted just as soon as possible after frost has left the ground, and it has sufficiently dried out. For the earliest crop plant small sets; we prefer the yellow ones, four inches apart in the rows. Very small sets are the best; those from one-third inch in diameter upwards will largely run to seed. We like to roll or tramp the onion ground before drawing the drills, which can be twelve inches apart, giving another tramp after covering the drills. Just as soon as the seed is sown start cultivating and keep at it constantly until the tops are so much grown as to prevent it; also weed the rows carefully, especially after a rain, when they will pull up most easily. It is no use planting this crop unless this matter of weeding is religiously attended to.

The so-called new onion culture is really a very old practice and was in vogue in Great Britain half a century or more ago. It consists of sowing seeds in flats or in a cold-frame late in February or early in March, and transplanting the seedlings in well-prepared ground about April 20. Very large bulbs are secured in this way; fine for exhibition, but they will not keep well; in fact, very few are sound after Christmas, and this mode of culture is not to be recommended where onions are wanted through the whole winter. For this method of culture Ailsa Craig and Prizetaker are excellent. For sowing outdoors, Danvers Yellow is the onion par excellence; Prizetaker, Australian Brown, and Red Wethersfield are all good. Shallots are a species of onion which if planted at the same time as the onion sets will produce a very heavy crop, each tuber producing ten or twelve new sets, which mature earlier than the onions, keep better, and are excellent for salads as well as cooking. It is surprising that more of these are not grown.

Asparagus is one of the most highly prized of vegetables and comes in season very early. It does not take a very large bed to

supply a small family, and if the ground is deeply trenched, well manured, and cared for, it is good for twenty years. Palmetto, Columbian White, and Giant Argenteuil are all splendid varieties. A bed 12 by 35, containing 150 plants, is sufficient for a small family. The plants should be in rows, three to three and a half feet apart, and eighteen inches between the plants. In planting, care must be taken to set the roots deeply, and cover only lightly at first, covering in gradually as the plants grow. For the asparagus beetle, spraying with arsenate of lead or paris green is effective, one application generally being sufficient.

Egg plants must have rich soil and cannot be planted out with safety before June; each plant is benefited by having a shovel or two of manure below it. Reliable sorts are New York Improved and Black Beauty. Peppers should not be planted in as rich soil as egg plants. Large Bell or Bull Nose, Golden Dawn, and Squash are popular varieties; Ruby King is fine for pickles. Chinese Giant is a huge variety of mild flavor, but too large. The little Cayenne is excellent also for pickles, and very ornamental.

Spinach of the round-leaved type is of course indispensable, and for summer use nothing beats the New Zealand variety. This must not be planted before May 10, however. With this latter vegetable and a small row of Swiss chard it is possible for a large family to secure a constant cut of greens for at least four months in the year.

I have not mentioned salad plants; of these, lettuce is the most valuable, and by starting seed in the home or cold-frame, and making successional sowings outdoors from the end of March until the middle of August, heads may be cut from the early part of May until November. For the earliest sowing, White Seeded Tennis Ball and Big Boston are leaders; for later sowings, May King, Deacon, Black Seeded Tennis Ball, and Sutton's Standwell are reliable. The Romaine or Cos Lettuce is popular with many; Trianon is a good self-bleaching sort. Endive is an excellent and handsome salad plant when well bleached; the plants want more severe thinning than lettuce, and to bleach them, the outer leaves should be gathered to a point and tied with raffia. Endive can be kept in a cellar, packed in dry sand through a good part of the winter. Green Curled and Batavian are splendid sorts.

Radishes are of easy culture; by making one or two spring sowings, and then again in August and early September, the finest flavored roots can be had. They are of little value in hot weather, as the roots get very tough. Early Scarlet Globe and French Breakfast are popular sorts. Of late years, the winter varieties like Black Spanish, have come to the front; these can be stored in sand and kept all winter; they make very large roots, and are of good flavor.

Curled Cress and White Mustard are easily grown salad plants which can be grown in flats in the home or in a cold-frame. The seeds do not require a covering but should have an ample water supply.

In miscellaneous vegetables, there are leeks, which should be sown only, and given rich culture, to secure big, handsome stalks; these keep in fine condition until May in a cold cellar. Musselburgh is a standard variety. A clump or two of chives takes up little space. For borderings, nothing is more beautiful than parsley; the plants should be thinned out six or eight inches apart. On well-drained land, with a covering of leaves, this will survive our New England winters. Dobbie's Selected and Champion Moss are beautifully curled types. White Velvet okra or gumbo is valuable for soups. It succeeds best in a hot summer, and the seed should not be sown before May 10 in this latitude. A few roots of the indispensable rhubarb and one or two roots of horse radish should always be included. In the way of sweet or pot herbs fennel, dill, sweet marjoram, sweet basil, sage, thyme, and summer savory are all very useful.

I have not mentioned mushrooms, which naturally should have a place when possible in a cellar, stable, or shed. A temperature of 50° to 55° suits them best; but they will produce if 10 degrees colder. Beds should never be made near a furnace or any drying heat, and the best heat at which to spawn is 85°. The home culture spawn produces very large mushrooms in a much shorter time than the English Milltrack. I have had them appear within three weeks, but the average would be nearer six weeks. If the manure should be rather cold, mushrooms may not appear for twelve weeks; and one year we had almost given up all hopes of a bed, and it produced well at the end of seventeen weeks. The beds

should be darkened and all possible air excluded. Watering is a necessary evil only; when applied it should be of a temperature of 100° to 120°.

This paper has already exceeded the original intention of the writer, who would say in conclusion, that he hopes more small growers will this season have the courage to plant a vegetable garden. Do not have one too large, which you cannot properly care for. Quite a small plot, well manured, constantly cultivated and weeded, and systematically planted, will be a source of pleasure as well as profit. Those who never had such a garden before will appreciate the value of fresh vegetables, and will find in this one way to combat the ever advancing cost of living. There are too many who, each season, have the garden fever, plant some ground, give it perhaps one cultivation, and then neglect it, hoping for the best. A well planted and tilled vegetable garden is a joy and an inspiration.

Buy the best seeds, replant or resow any bare spaces as soon as crops are cleared, and you will be astonished what a small space will yield, if cropped intelligently and intensively. Then when it is too late to plant any vegetable crop, sow down bare ground with red clover or winter rye, to prevent surface washing, and at the same time, add fertility to the soil; for these cover crops, when turned in, supply considerable nutrition; they also give a touch of green which is very refreshing after each vanishing fall of snow.

Discussion.

The question was asked how to tell sour soil.

Mr. Craig replied that by placing blue litmus paper in the ground, if it turned pinkish it was evidence that the soil was sour and needed lime. In reply to another question concerning the use of poultry manure he said that it was best to use it as a top dressing, scattered through the rows and well raked in. He said it should be used with great caution and always mixed with two or three times its bulk in earth.

Wilfrid Wheeler called attention to the value of the American toad in the garden as an insect destroyer. Last year toads were

scarce which perhaps accounts for the abundance of insects. He advised the keeping up of a supply of toads and there would be fewer insects.

James H. Bowditch spoke of the value of birds in the garden as insect exterminators and said that it was worth while to do everything possible to attract them.

Mr. Craig also spoke of the good work done by the birds and said that we should have no crops without them. Regarding the omnipresent cutworms Mr. Craig said it was an excellent plan to plow the garden in the late fall and to leave it open all winter. By this means many insects which hibernate in the ground would be destroyed.

DISCUSSION OF FRUIT CULTURE.

March 2, 1912.

The meeting held at Horticultural Hall today was devoted to a general discussion of the subject of fruit growing. Edward B. Wilder, Chairman of the Committee on Lectures, presided and there were also present, as principal speakers, Mr. Wilfrid Wheeler of Concord, Massachusetts; Professor F. C. Sears of the Massachusetts Agricultural College; Professor B. S. Pickett of the New Hampshire College, Durham; and Mr. Harold L. Frost of Arlington, Massachusetts.

A stenographic report of the meeting is given herewith.

THE FRUIT QUESTION.

By Wilfrid Wheeler, Concord, Mass.

With Stereopticon Illustrations.

In the great movement countryward which has been upon our minds so much of late years the fruit question has taken a very important part, for with this great question of country life opened, it has been necessary to give people who are going back to our farms a sure and safe means of livelihood, and no branch of agriculture or horticulture has offered better inducement for a good living on the farm than fruit growing. New Englanders have seen the beautiful western apple come with its fine color, large size, and splendid package, and take our market by storm. Hundreds of thousands of dollars have gone from New England to the pockets of our western growers, almost before we knew it, while still greater amounts have gone from the East to the West for investments in western fruit lands; while had such sums been devoted to the development of our country, the East would now have been in the

same condition as the West is at present in regard to fruit growing. At last we have come to sit up and take notice, and are now just beginning to realize that we have sold our birthright, have neglected our opportunities, and have allowed others to get rich on our shiftlessness. Here in a natural fruit country we have imported over three-fifths of the fruit consumed, making it more expensive for our people to get good fruit, and forcing many to do without a food which should be eaten every day as regularly as we take our meals.

No form of food is as healthful as fruit, yet its high price makes it almost prohibitive to a large per cent of our people. New England is a natural fruit country. We have abundant evidence of this on every hand. Go into the wildest parts of the country and you will find growing as they have done for hundreds of years, the apple, cherry, plum, blackberry, raspberry, strawberry, gooseberry, and grape. Our soils are natural fruit soils. The rugged New England hills are full of the plant food necessary to grow the highest quality of fruit in abundance.

Our people are a large fruit-consuming people, which fact can be easily attested by noting the arrival each day in our markets of ships, trains, and wagons loaded with fruit from all parts of the world; or, if a closer point of view be necessary, consider the large number of fruit-stands which now are apparent on every street, to say nothing of grocery and provision stores which handle all sorts of fruit. This fruit is consumed somewhere, or else the storemen could not make a profit and so it is fair to assume that our people use it. On the other hand, we are not a fruit-growing people. This society has found it very difficult within the past few years to get a fruit garden entered in its prize contests, and it has been almost as difficult to get a commercial orchard or vineyard. Conditions have so changed in the past forty or fifty years that while then there was keen competition between the owners of gardens and farms for honors in this society along the fruit growing lines, this competition has now come down largely to the Hall Exhibitions, which while splendid in their way, do not give the broad scope for the advancement of fruit culture that garden and orchard competition would.

The causes of this reduction in garden and commercial fruit

growing are many. As a commercial proposition prices were not satisfactory and fruit growing was seldom conducted as a complete business, but was more often a side issue to general farming. Then pest and disease crept in and the man who was not trained to combat these soon gave up in disgust and allowed his trees to become a prey to the destructive conditions about him. On the other hand, the amateur found he could buy his fruit cheaper than he could grow it, and consequently the home garden was gradually given up.

Fortunately now, we have come to take a more comprehensive view of the situation and have begun to realize that we can grow fruit near a market as cheaply as it can be grown three thousand miles from that market; that we can control insects, diseases, and other pests; that our fruit is of higher quality, and before all that there is a profitable income to the person who will make a business of fruit growing. In the house garden we have found that while it may cost us a little more to grow our fruit, we can get better quality, have varieties we cannot buy, have the pleasure of seeing the trees in flower, leaf, and fruit; in fact, getting in close personal touch with an occupation which is at once healthful, beautiful, and practical.

Many of us are restricted more or less in our choice of soils, location, and exposure; our gardens may be small, too dry or to wet, wind-swept, or exposed to the hot scorching rays of the summer sun; yet these conditions should not deter us from planting our native hardy fruits. A wet soil can be drained; a dry one improved by cultivation and the addition of some form of humus; windbreaks can be planted on exposed places; and where there is too much shade trees can be cut out.

The apple will thrive on almost any soil provided it is not too wet. Standard apples should be planted commercially and in gardens where there is plenty of room; in small gardens dwarf apples can be grown, and if necessary trained in almost any shape. Dwarf apples on Paradise stock make smaller trees than those on Doucin. The apple should be used more often as an ornament on large estates, for what could be more beautiful than this tree full of pink and white blossoms in the spring, and fruit of all shades of red and yellow in the summer and fall? As an ornamental tree

such varieties as the Gravenstein, Williams, and McIntosh Red should be used, as these are practically annual bearers.

In all fruit planting thorough preparation of the ground is essential. It is better to wait a year and prepare your ground rather than plant on newly-turned sod-land, although in many cases successful plantings of apples have been made right in newly-cleared woodland, pasture, or even on heavy sod; but the person who is able to handle trees successfully in this way could do so under any conditions. On old garden soil small fruit, pears, cherries, and plums do much better, for these fruits can stand an abundance of nitrogen better than can the apple and grape. By thorough preparation of the soil is meant breaking it up from the sod or fallow state and planting to some crop as corn, potatoes, or other hard crop, so that all perennial weeds and grasses shall be killed out. On light soil, fertilizer in the form of manure or green crops ploughed in will fit the land in good shape. One year's cultivation of the soil will generally suffice to place it in the best condition and after the trees are set, yearly applications of a mixture of basic slag, low grade sulphate of potash, and nitrate of soda in the following proportions can be used:

6 pounds of slag
2 pounds of potash (low grade sulphate)
I pound nitrate of soda.

An application of a pound of this mixture per tree, per year of tree's age, will keep it growing in a healthy state. That is, if the tree is one year old, give one pound of mixture; if two years, two pounds, and so on, up to five years, when if the tree is bearing, the nitrate of soda should be dropped and nitrogen supplied by turning under leguminous crops, or in case of sod-orchards by the application of manure or decayed vegetable matter. Rules like the above are only in general and cannot be made fast as the laws of the Medes and Persians, for the successful person will soon find out what his soil needs and govern himself accordingly. Certainly most of our soils need lime, and the best form of lime to use is calcium carbonate or pure ground unburned limestone. This does not burn the lime from the soil, neither is it available at once, but can be applied in small yearly applications, and its effect on soils is most beneficial. For heavy clay or muck soil the caustic lime is better.

Fertilizers for fruits should contain all the necessary elements of plant food the first few years of a tree's life, with a slight excess of nitrogen during at least the first five years of the growing stage of the tree. For bush or vine, a fertilizer analyzing 6–8–5 would be about right. As trees, etc., come into bearing, an excess of nitrogen is likely to cause a softening of the fruit and wood, or will produce oversized fruit at the expense of color and quality. This is particularly true in the apple, strawberry, and grape.

There are many methods in planting fruit trees, but whether in garden or orchard culture, it is always best to plant so that all work can be done at the least expense. Straight rows in both directions facilitate cultivation, spraying, and gathering the product; and while interplanting of other crops may be all right for a few years, it is not best to continue the practice to the detriment of the permanent trees. However, in the home garden dwarf trees and small fruits should be set between standards if the space is limited. Such fruits as the gooseberry, currant, and blackberry do better with slight shade than when planted in the sun, and are especially adapted for interplanting. A great many of the best new orchards and vineyards in the East have been developed by some interplanted crop like currants or other small fruits. The peach is often used as a filler in the Connecticut apple orchards, while strawberries are very often used the first few years in peach, pear, and apple orchards.

The fruit grower of today has got to spray and spray often. Insect pests, fungous and other diseases cannot be controlled in any other way, but the question often comes up "What shall we spray with?" In the first place we must consider what we are spraying for. There are three essential points to remember: first, that we spray to control leaf-eating insects; second, to control sucking insects; and third, to control diseases. Therefore we have got to use three kinds of spraying material, namely, a stomach poison for leaf-eating insects, as gypsy or brown-tail moth, a contact poison for sucking insects, as scale or aphis, and a fungicidal spray for diseases. At the present time the best stomach poison we have is arsenate of lead, while soluble oils and lime sulphur are the best contact poisons. Whale oil soap and tobacco dust are also used in this way, but the effect of these latter is too easily

destroyed by climatic conditions to make them effective on a large scale.

When we come to a fungicide, we are almost as much at sea as we were ten years ago. Bordeaux mixture, our standard for so many years, has caused a great deal of trouble, particularly in the russeting of the apple, and by many has been discarded in favor of lime and sulphur which latter is by far the most satisfactory fungicide at present in use. When lime and sulphur is used with arsenide of lead, it forms a most complete spray mixture both as an insecticide and fungicide, particularly for use just after the blossoms fall from the trees the end of May or early June. Lime and sulphur is used as a spray for scale insects on dormant trees by reducing the commercial lime and sulphur about ten times. As a spray on green foliage by reducing it about fifty times and the addition of three pounds of arsenate of lead at this time makes a most complete mixture for both insects and fungous diseases. Soluble oils are used at the rate of one gallon of oil to ten or twelve of water as a spray on dormant trees for scale insects.

Arsenate of lead for leaf-eating insects alone is used at the rate of four to six pounds to fifty gallons of water.

Spray outfits can be purchased to suit the amount of work to be done. Power outfits should only be used on large orchards. A fifty gallon barrel and good hand-pump will take care of almost any amount of fruit trees up to ten acres. A very good outfit for a home garden is the knapsack sprayer holding not more than three gallons of water. Nozzles should be selected to break up the spray as much as possible for leaf-spraying while a flat spray is best for dormant tree work.

Another very important subject in this connection is pruning, and while it is impossible to go into all the details, yet a few essential points can be touched on. Fruit in its development needs plenty of sun and air. The trees should be pruned so that all parts are open to these very necessary elements. All surplus crossing branches should be removed as well as dead wood and suckers. Summer pruning by pinching off strong growths has a tendency to throw the tree into early fruiting while too much pruning at one time will cause an abundance of wood growth at the expense of fruit and development. All wounds larger than one

inch in diameter made in pruning should be treated with white lead, coal tar, or some other tree paint in order to protect the tree from decay.

In the small fruit, the currant and gooseberry should be pruned by removing the three and four year wood. The size and quality of the fruit will be better on the young wood. Blackberries and raspberries should be pruned by removing the canes which have just fruited. Summer pruning by pinching back strong growths has a tendency to increase production.

When varieties in fruit are to be considered, and this is one of the most important questions to the commercial man, for upon the high quality of his fruit must he build his reputation, yet at the same time get the maximum yield at the minimum expense; while with the amateur, variety is an all important question, for although large yields are not the most essential thing to consider, quality and length of season are most necessary points for the home gardener. A list of varieties may be rather dull reading, still there are many who may not have access to the latest bulletins on this subject. So if you will bear with me, I will go over a list carefully selected for this locality, and the first list will be for commercial planting and the second for amateur and home-garden planting.

Commercial Planting.

Apples. Baldwin, McIntosh, R. I. Greening, Northern Spy in some locations and only on a fairly heavy soil, Gravenstein, Roxbury Russet, Wealthy, Williams Favorite, and Wagener.

Pears. Bartlett, Sheldon, Lawrence, Anjou, Bosc, Dana's Hovey, Seckel, and Duchess.

Plums. Burbank and Damson.

Peaches. Greensboro, Carman, Belle of Georgia, Elberta, and Niagara.

Cherries. Early Richmond, Montmorency, Black Tartarian, and Yellow Spanish.

Strawberries. Glen Mary, Marshall (south of Boston), Bubach, Sample, Barrymore, Black Beauty, Senator Dunlap, and Stevens' Late Champion.

Raspberries. *Red,* Cuthbert, Herbert.
Black, Plum Farmer, Gregg.
Purple, Schaffer.
Blackberries. Snyder and Eldorado.
Currants. Fay's, Wilder, and Perfection.
Gooseberries. Downing.
Grapes. Concord, Niagara, Delaware, Worden, and Moore's Early.

The list for the house or amateur garden will of necessity be much longer and while it will include some of our best commercial varieties, there are others of very high quality which for some reason or other cannot be adapted for market conditions. Some are too soft, or are unproductive, do not make a strong tree, vine or bush, are not the right color to suit a particular market, yet surpass commercial varieties in the all essential point of quality. In particular is this true of our native grapes, the market demand being only for Concord, Niagara, Delaware, and Catawba, while there are over twenty varieties which surpass all but the Delaware in quality. Among some of these desirable varieties for the garden are the following: Worden, Moore's Diamond, Salem, Agawam, Green Mountain, Barry, Herbert, Gaetner, Lindley, Wilder, Downing, and Hidalgo.

So much in the quality of the grape depends upon its culture that it may not be amiss to go into the matter a little. The grape should always be planted in the sunniest part of the garden and a light rather sandy soil is preferable; a soil with good drainage will give higher quality grapes than a cold, damp soil. The grape likes an abundance of phosphoric acid and potash which should be supplied in the form of bone meal and sulphate of potash. In pruning, care should be taken always to select good strong wood of the previous season's growth, and whatever system you may use, bear in mind that the less wood you have on a vine the better and larger will be your product. The grape can be used in so many ways that no garden, however small, should be without it. As a trellis vine on a house or over an arbor, or to cover up the wood pile or shed, it cannot be surpassed, and when you add to its ornamental value that of a delicious fruit it should be valued and ranked highest in our garden fruits.

Of late years there has come into existence a new group of strawberries commonly called the everbearing variety. These unlike the French and Swedish berries are true everbearers. They must be planted in good soil with plenty of moisture. All blossoms should be removed in May so that the natural bearing season will be eliminated; the plants will then come into bearing in July and bear an abundance of fruit until the frost comes. The best varieties of these are the Pan American, Superb, and Productive. Other strawberries for the home garden are Marshall, Senator Dunlap, Barrymore, North Shore, Black Beauty, Golden Gate, Stevens' Late Champion, Brandywine, and Abington.

Apples. *Summer*, Yellow Transparent, Sweet Bough, Duchess of Oldenburgh, Red Astrachan, Williams.
Fall, Gravenstein, Porter, Wealthy, McIntosh, Rolfe and Twenty-Ounce for cooking, Fall Pippin, Cox Orange Pippin, and Maiden Blush.
Winter, Baldwin, R. I. Greening, Wagener, Tolman Sweet, Roxbury Russet, Belleflower, King in some places, Fameuse, Sutton, Palmer Greening, and Spitzenberg.

Pears. *Summer*, Doyenne, Clapp's Favorite, Bartlett, Brandywine.
Fall, Seckel, Sheldon, Belle Lucrative, Louise Bonne de Jersey, Vermont Beauty, Wilder, Worden Seckel.
Winter, Bosc, Dana's Hovey, Anjou, Lawrence, Duchess, and Kieffer.

Peaches. Greensboro, Waddell, Carman, Belle of Georgia, Elberta, and Late Crawford.

Plums. *Japanese*, Burbank, Abundance, Wickson.
European, Bradshaw, Jefferson, Lincoln, Shippers' Pride, Moore's Arctic, and Damson.

Cherry. *Sour*, Richmond, Montmorency, Late Duke.
Sweet, Black Tartarian, Gov. Wood, Windsor, and Yellow Spanish.

Quince. Champion.

Currant. Fay's, Wilder, Perfection, White Grape, Black Naples.

Gooseberry. Downing, Pearl, Columbus, Industry, Triumph, Chautauqua, and Bates.

Blackberry. Eldorado, Agawam, Early Harvest, Kittatinny.
Raspberry. *Red,* Cuthbert, Herbert, Eaton, Loudon.
Purple, Columbus, Schaffer.
Black, Gregg, Plum Farmer.
White, Yellow Queen.

In closing, let me leave these thoughts with you, that New England has all the essential points necessary to grow good fruit. The only thing we need to have is faith and perseverance; that we can grow all the fruit we need in our gardens, which will be fresher and better than that we buy; that we can have lots of pleasure growing it, and if we care to, can make fruit growing a profitable means of livelihood, keeping us in the free open air and tending toward a saner, more healthy, and more rational way of living.

Now, if we may have the lights turned out.

I am going to run through these pictures rather hurriedly, as they cover quite a bit of ground. I am not necessarily going into cultural directions of the particular subjects I am going to touch on; but in order to open up the discussion later on I shall try to answer the question myself on the small fruits, and the other men who are here will take up the particular subject that has been assigned to them.

In the small fruits, the strawberry is the most important. It has been grown more in market quantities throughout the country than any other particular fruit. Here are a few of the types of our strawberries which we grow in this vicinity.

Beginning on the left hand corner and taking them in their order is the Brandywine; the next is the Senator Dunlap; the next the Meade; the next Parsons Beauty; the next, if I remember rightly, is the Chesapeake.

In growing strawberries in our vicinity, and particularly for the market or home garden use, I believe the hill system is far preferable to the matted row. In this system, that is where they are grown in wide beds, four plats across the bed, we get a much better natural condition than we do where the hills are isolated too much. The great trouble has been, in having the hills isolated, the frost kills them out. In this system, with four plants across the bed, the plats protect themselves better and come out much better in the spring.

The next picture will show the individual plant in the blossoming season. There is a space around the plant, and you can get a much better color on the fruit if the sun is allowed to strike the fruit on all sides.

Here is an individual plant in fruit, on the hill system, showing the abundance of fruit borne. The leaves are partially cut away so that the fruit is more exposed than it would be in the natural condition of the bed. This particular plant happens to be the Parsons Beauty. The last picture showed the same plant in blossom.

Here is a hill along the edge of the same bed, or one of the beds. This happens to be a variety called New York, a rather coarse berry, but at the same time it is a very productive berry, but not of as high quality as some of our other varieties. As you see, the large berry in the middle happens to be a corrugated berry, and these corrugated berries are not of the highest quality.

Here is a picture taken from the middle of one of these beds, showing the abundance of the fruit in the middle of it. Here is a bed, a matted row bed, under the old conditions. Of course, most of our strawberries for the market are grown under these conditions. This shows the mulching put on to protect the fruit from sand or mud during rain. The strawberry is one of the best plants that we have here in developing orchards or other fruit plantations.

Here is an orchard in Massachusetts that has been developed greatly by planting strawberries. This shows the strawberries of the lower side, the upper part of the orchard having been planted previously and allowed to go into grass. That is one of the great advantages of our small fruits, they lend themselves better than anything else to the development of the trees where they are planted. The gooseberry and the blackberry can be planted between the orchard trees, and they bring in some revenue while the trees are coming into bearing. The small fruits can be planted among the small trees, and thus the whole ground is utilized.

Here are gooseberries planted in between pears, getting the best results from the ground while the trees are coming into bearing. Currants can be used in the same way, also blackberries and raspberries. In the gooseberries and currants we have a great many failures, which I think is probably from the fact that we do not thin out the wood enough.

Here is a gooseberry bush, and the currant would be under the same conditions. In three or four years they grow to wood, and the berries grow smaller and smaller.

The next picture will show that bush pruned as it should be, taking out the old wood, and leaving only three or four stems of three-year-old wood. That stem of three-year-old wood is left to show the difference between the wood which is only one year old and wood which is two or three years old.

The gooseberry is, I think, one of our most neglected fruits. We have practically given it up in our gardens and use it only as a cooking fruit, but when you plant the better varieties, or our larger hybrid varieties, there is no fruit to my mind better to eat than the gooseberry when it is ripe. And I might say that the quality in them is largely a matter of ripeness. The same is true of practically all our small fruits.

The currant is treated like the gooseberry; it should be trimmed and pruned out thoroughly in order to get the best fruit. We are apt to see the currants growing on a heavily wooded plant, and it is almost impossible for them to be of any size under those conditions. This bush has been thoroughly pruned, and we get such fruit as you see there. They almost bend over with the weight of the fruit.

The raspberry is one of our important small fruits. It lends itself to pruning very nicely, and I think the two or three pictures which are coming will show the best method of pruning. The plant shown in this picture shows large wood, but when it is properly pruned the fruit would be so much larger that it would pay to do it.

This picture shows it pruned, cut back about as it should be.

The next picture shows it tied up to a stake.

The grape is one of our very best garden fruits. This happens to be a vine of Salem showing the abundance of fruit we can get in a small space. It should be planted against a fence or in an arbor. It should be grown up in a single stem, and grown up on a house or a trellis. It should be grown very much more in every garden, and it should be grown, I think, commercially, because when we can grow a high class of fruit it will bring a good price.

The plum is one of the prettiest trees in blossom that we have.

Here is an apple tree in comparison with a child of about the

same age. A Wealthy apple tree of about five years' bearing will produce about a bushel of apples. This came from New York State.

Another Wealthy apple in Massachusetts showing the tree properly planted and pruned about the right height.

The McIntosh apple of the same age as the last Wealthy, showing a good type of tree grown right here in Massachusetts.

The Winter Banana apple, one of our very best, which has been recently introduced here in the East, is one of the very finest types we have. That particular apple grew on a dwarf tree and is one of the best.

This picture shows what we can do with our old discarded trees in the pasture along the stone walls. Here was an old tree in the corner of a stone wall grafted and bearing a good crop of apples, when before it was practically worthless.

This shows a good type of pear tree, the Seckel. You will see this column coming up through here, making it a very strong tree. Seven years old that tree bore a bushel and a half of pears, so you can see that it is an early-bearing pear.

I think that completes the pictures.

Now, if we can have the light again, I am going to ask Professor Sears to talk to us about fifteen minutes on the subject of planting, cultivating, and fertilizing of fruit.

PLANTING, CULTIVATION, AND FERTILIZERS.

By Prof. F. C. Sears, Amherst, Mass.

Mr. Chairman and friends: I have not written my speech out though I do not know but I ought to have. Your Chairman warned me that I was not to speak more than fifteen minutes and I will endeavor to keep within the limit.

I want first of all to say that my subject, as the Chairman has announced, is the Planting, Cultivation, and Fertilizing of Fruit, and I want to take a very unfair advantage of you people by discussing first one phase of planting which, it seems to me, is a decidedly important one, and the one which is ordinarily neglected

(and perhaps I would show better judgment to neglect it this afternoon) and that is the question of whether we shall plant or not. I am talking, of course, especially from the commercial standpoint. There is no question about planting for home use. Every one should do that. But I do feel that there *is* quite a question on the matter of commercial plantations. I have no doubt that in this audience there are a great many people who have an orchard, or who want one. If that is not true this is a very unusual Massachusetts audience.

I therefore want to give you my experience yesterday in my office in Amherst. I went back to my office after dinner and was met by one of my short-course men, a graduate of Harvard, who wanted to get some advice on what part of the State to locate in. After he had gone a young lady came in who had a brother who had graduated from Harvard and she wanted to know where this young man could be placed so that he could learn orcharding. I gave her as good advice as I could and she went out. After she had gone a young man came in, a senior in Yale, who came up with the special object of talking over orchardizing with me. He said he was going into orcharding on a large scale. I talked the matter over with him and gave him what advice I could, trying to make him realize the difficulties, but when he left the office he was of the same opinion. I told him that he ought at least to have a foreman who was well up in the business. About ten minutes after he left a traveling man came in, or at least I think he is still a traveling man, and I know he had been. He had already bought a farm, so that it was no use to discourage him, and I gave him as good advice as I could, and sent him away as happy as it was possible for me to do. That is a sample of what I did yesterday. I also dictated seven or eight letters to people who were in the same predicament. This is why I think that we ought seriously to consider that side of the question. I dislike to take this stand, because I have been very enthusiastic in the matter of orcharding, and I still am. As you may know, I have an orchard, and I am afraid that the people may think I want the market for myself. Of course I want a share of it but I do not want it all. I still believe that for people who understand the business or go into it in the right way, orcharding is the best branch of farming.

I do not think myself that we are coming to a time when apples will not be worth picking, and I have enough faith in New England apples to believe that when the time comes that there is not to be an over-production but a larger production than we have at the present time, Massachusetts will stand at least as good a show as any other part of the country. But I cannot help feeling that we ought to be a little more conservative than we are.

In the short time allowed to me, I am going to take a few scattered points here and there in reference to the three subjects assigned to me, and attempt to give you a few suggestions.

First, in the matter of planting I want to endorse and emphasize what Mr. Wheeler has said in reference to varieties, because I feel that that is a crucial point with us; and I think I can endorse almost the entire list he gave. I think it is an excellent one. I think where we are likely to err the most is in wanting to grow the Western varieties. The only one Mr. Wheeler put in was the Winter Banana, and I have seen some as fine Winter Bananas grown here as are grown anywhere. People look at some of our fruit stands in this city, or any other city, and see these beautiful Western fruits and they say, "That is what I want. I want to grow some of those Spitzenburgs or Winesaps or Delicious or Winter Bananas, I don't want to bother with these Eastern varieties." Or they send in a list, and ask for advice concerning them. Or more often they send to nurseries and buy the trees without asking advice. Now I think that is one of the most serious mistakes we can make, because out of the whole list which is grown out there, there are very few that may be considered as valuable commercial varieties for New England. Just another word on quality: We ought always to insist on high quality. People are coming to feel that New England can grow — at least we people in this part of the country feel that we can grow — fruit finer in quality than they can in the West. And that has been the slogan of our campaign, that we can grow better fruit in the East than they can in the West. That is one of the strongest arguments in favor of the New England industry, and I think we make a great mistake in not planting high-grade varieties. And yet some insist on planting such varieties as the Ben Davis. I should say stick to the high quality varieties. Do not grow any-

thing lower in quality than a Baldwin. A well-grown Baldwin is good enough for anybody.

Next I want to say just a word on the matter of soils, because I feel that very often we make a mistake in the place we put our different plantations. We do not know as much about soils as we ought to, but we do know that the Baldwin, for instance, demands a very different type of soil from the Rhode Island Greening. We know the soil requirements of the Northern Spy and some other of our main varieties. And yet you will very often see Baldwins planted where there ought to be Rhode Island Greenings; and Rhode Island Greenings where there ought to be Baldwins. That I think needs more consideration on the part of the average planter than is usually given to it.

In the matter of setting: I think we ought to be much more particular than we ordinarily are in laying and setting out the orchard. This is one of my hobbies, and yet I think it is a good, legitimate hobby. It is common to see the old orchard laid out without any care at all, and you find this the case even in up-to-date young commercial orchards. In my experience it is not a serious matter to set out an orchard so carefully that the trees row nicely in every direction, and I certainly feel that while you may call it drawing the point rather fine, it makes a great difference in the general appearance of the orchard, and to me makes enough difference so I would be perfectly willing to pay the small extra expense which there might be. I do not think myself that there need be any great extra cost. I believe you can put in an orchard in a proper manner at just about the same expense that you can put one in haphazard.

Next the question as to the distances of the trees apart. I think very frequently we make a mistake by getting the trees too close together. That varies, of course, with soils, and particularly with varieties; but I have pretty nearly become convinced that we never ought to plant trees of the standard variety at less than forty feet apart. I know that some of our excellent authorities do not agree with me on that, and of course I do not expect them to. If we were paying $2000 an acre as they do for bearing orchards out West, it would be a different matter; but our land is not so high priced that we cannot afford a few feet more, and I am sure

that we will get our investment back in the ease in caring for the plantation. So I would urge people not to plant less than forty feet apart unless they have a light soil and are planting the smaller growing varieties.

Just another point on the matter of planting, and that is the question of fillers. Mr. Wheeler spoke very enthusiastically on that, and I want to endorse what he said as to the use of small fruits as an inter-crop in the orchard. I think they are excellent. We have found at Amherst that the early bearing trees used as fillers was a good way to occupy the land. We have set Baldwins for example as the standard trees, and Wageners or Wealthies as fillers, thinking we were getting more from the land in that way than in any other. If the man was a farmer, that might not be true, because he might be able to plant some other crops between his standards and get more than he would get with the fillers.

Now, coming to my second point, cultivation, I want to urge every one who is starting a commercial orchard, to grow some crop in the orchard. I think for the good of the orchard we ought to grow some other crop among the trees. I do not think it is feasible to grow the orchard solely as an orchard, and cultivate the land between the trees merely for the good of the trees. I heard Mr. M. C. Burritt, of the Tribune Farmer, of New York, speak at Amherst, and he said that they had a number of orchards in that State where the inter-crop had paid in eight years the cost of the orchard. If that can be done it is a long step towards making the orchard pay, and I should always grow some crop between the trees. When it comes to the crop to grow, it is very difficult to give specific advice. We have found at Amherst that corn, potatoes, beans, and cabbage are most satisfactory crops.

Then, on this matter of cultivation, is the question of cover crops, that is, the crops to be grown on the land, and sown the latter part of the season. And while that is in a way an old question, it seems to me that we do not (at least I am sure it is so in my case) appreciate the importance of it; and there are a good many things about it that we do not as yet know. The orchard I happen to be interested in, the land is rather light, and it is of course important that we keep plenty of humus in the soil, and unless you have plenty of manure, it means large growing cover

crops that can be grown on the farm. We have found crops of buckwheat and soy beans very satisfactory, and a third one, which is very seldom mentioned, but which we find to be decidedly satisfactory, is the ordinary pea bean, the "Boston baked bean". So much for cultivation. I have taken the crop end of it. So far as cultivation itself is concerned in the orchard, it is of course necessary to make it thorough, and to use the kind of tools among the trees that will not in any way injure them.

Next the question of fertilizing. If you have been following the agricultural papers for the last year carefully, you know that there has been a great deal of discussion on this question of fertilizing, and that the Experiment Station, at Geneva, New York, has come out with a bulletin, showing that under their conditions they have not gained enough from fertilizing the orchard to pay for the application of the fertilizing material, let alone the labor of doing it and the cost of the material. Professor Hedrick, the horticulturist there, is very strongly against the indiscriminate fertilizing of orchards and probably rightly so. Against that is the Pennsylvania Station which has come out with practically just the reverse result. I want to read just a line or two from the Pennsylvania results. I am reading the Pennsylvania results, because that is the result that I believe in most strongly. If you are interested in "no fertilization" I will refer you to Professor Hedrick. In this Pennsylvania experiment, which was largely a coöperative experiment among farmers, they found that fertilization gives from three to fourteen times as much fruit as no fertilization. In one case there was a gain of 868 bushels at a cost of $14. an acre for fertilizers. Professor Stewart, who writes this article, closes in this way, "We believe there is no reasonable possibility that these results are due to any other agent than fertilizer. The results stop abruptly where the fertilizer was not used."

Now, I don't see how anyone is going to get around these results; where you fertilize one block and do not fertilize another block, and you find that the fertilized block gives more than the other, it seems to me that there is no conclusion which you can reach except that the fertilizer is a good thing. And to support this further you will find, I think, take the country through, that the man who persistently fertilizes, using the right kind of ferti-

lizer, gets a crop year after year. It seems to me that when any one comes forward with a proposition like Professor Hedrick's, that you cannot get your money back if you apply fertilizers, it is up to them to prove it. (Applause.)

Mr. WHEELER. Professor Pickett, of Durham, New Hampshire, will now give us a short talk on pruning, especially in reference to fruit trees. Professor Pickett of New Hampshire.

PRUNING.

By Professor B. S. Pickett, Durham, N. H.

Ladies and gentlemen: To attempt to give you anything like a full discussion on the subject of pruning in the few minutes at my disposal, would be impossible, so I will have to confine myself to some one particular phase of it. I must confess that I did not have this particular phase which I will speak on this afternoon picked out for me, but I had an opportunity to choose it myself.

I am going to confine my remarks to the pruning of fruit trees. Pruning is performed for several different purposes, all under two main heads. One is the shaping of the plant to that shape that the owner desires it. The other is that he may simply regulate its fruit-bearing habits. We have no reasonable excuse for the operation of pruning unless it leads to increased fruit production, or to the improvement of the quality of the fruit which will be produced. The operation of pruning, therefore, gives the shape of the tree which we want; it gives us the branches in the place where the sunlight and air may come to them most suitable for the development and perfection of the variety of the fruit tree which we are pruning. Sometimes we prune with an idea of more or less thinning out or checking the quantity of fruit which is to be borne; but that too comes under the general head of the regulation of the wood which will bear the fruit, regulating it in such a way as to produce fruit of certain sizes or qualities.

Pruning is an operation, or a series of operations, that depends for its exactness and perfection on many circumstances. We prune the new trees in quite a different way from that in which

we prune the old trees. At the various stages in the particular life of any particular kind of tree we must suit the method of pruning to that stage of the development of the tree. In our standard fruit trees which we use in a commercial way, we are obliged to adopt different methods in the first two or three years than we adopt in the next six or eight years, and in the next stage another method, and at old age still another method, when the tree has reached say thirty years and has grown into the old stage. Each particular stage in the development of trees calls for a different kind of treatment. A very famous horticulturist once said that pruning was a succession of judgments, and that is the best definition of pruning I ever heard.

The operation of pruning consists in removing certain amounts of the wood. We have several tools with which we work. The simplest one, and the most effective one of all, is a knife. We can use a great many different forms and shapes, but one of the cheapest and most effective forms of knives for pruning is the one I hold in my hand, which is one with a hook blade, not too thick. It is made of excellent steel and cuts very nicely. On all branches that can be cut readily with a knife, that is the best tool, for we can get a perfect cut, and it is the most effective tool in a small plantation. We have tools which work more rapidly, but we do not have a tool that makes such a good cut. The most effective tool for rapid work, and that is the kind of work we must do in large plantations and on large trees, is the pruning shears. There are many forms and types of these, but the best of them is not any too good. Anyone but a good workman, in pruning, is almost certain to try to use them on branches a little too large. A man's hand is a little stronger when you have a purchase that you can get on the end of the handles on the branch, than the shears are usually made to withstand, and therefore it is desirable to get the very best shears that are made. I like the particular kind that I have here, which is called the French wheel pruning shear, the best thing I have happened to run across myself. This particular pair is the 10-inch size, the largest size ordinarily sold in this country. I like the largest size again because they are stronger than the smaller sized shears, and therefore stand the work and racket better than the others. In using these you cannot make

quite so sharp and clear a cut as you can with the knife. This part of the shear is rather broad and somewhat bruises the bark in the operation of making the cut, but you can remove branches to three-quarters of an inch in diameter with these shears, and you can remove larger branches if you are careful to bring the branch back a little so as to spring it. If you twist the shears in working them you are almost certain to spring the branch and make a ragged cut.

For large branches the best implement I know of is the forest tree pruning saw. That will remove branches up to three or four inches in diameter, removing branches up to three inches very readily. This is in the shape of a bow with a band saw across the front. It works rapidly, and is made with a swivel, so that the saw will twist in any direction, and you can cut quite a circle in the forks of the branches, if you desire. It is pointed near the end.

For larger branches a carpenter's saw with a comparatively narrow point is the best thing I know of. The saws which are commonly called pruning saws, the old type that you see, which are at least most commonly advertised, are too thick — the saw blade is as thick at the back as it is at the teeth and therefore pinches, and the steel in them is poor, and they work very hard.

The saw that I like least of all is the very popular pruning saw with teeth on both sides. The teeth on the top side I suppose were made to catch in the branches above, or on your fingers. At least, that is where they do catch, any way. (Laughter.)

Now, with these few remarks as a sort of an introduction, I want to ask you to look at some pictures which will illustrate the operations of pruning better than I can tell them.

With young trees we have two types as a rule that we buy from the nurseries; two general types. I would not want to tell you how many types altogether.

A two-year-old tree is a tree of this kind that has been headed back in the nursery to whatever height the nurseryman thought best. They carry a number of branches, usually from three to seven or eight. If you get a tree that shows signs of three branches, like this one, for example, you can usually be suspicious that it is three years old. There are other tests as well, but that is one of them.

Now, if we could start with an ideal tree, we would start with one that was one year old, without any spreading branches. That tree should be cut back when it is planted to the height at which the owner wishes to have the head of his tree. Supposing it is cut out at that point there, from these buds, three to five or six, or more, as the case may be arise branches. From these branches one chooses the ones which he wishes to form the head of the tree, from three to five usually. It is always difficult in diagrammatic things to show things in perspective. These branches particularly should be distributed around the stem of that tree in such a way that they form a cup-shaped head. Then they should be cut back to various lengths. I am not very particular myself if the tree is cut back to six or seven buds, as in this case, or a dozen; it depends on the way the tree has been grown. I usually cut it back a half season's growth.

The first two or three years after the tree is planted should be devoted to the formation of the head of that tree, and no matter how much pruning it takes to make the tree conform to the ideal of the owner, that should be done.

Having once gotten the trees to the point where the head is formed, they should then be left rather severely alone for a while, simply thinning out the branches. I will show that in a later picture.

This illustration shows the tree at the third year of growth. And then this one shows it as it would appear a good many years later. Now, the particular point about this is that these branches are placed well apart, the reason for that being if forks are allowed to form in the tree, the tree will split apart in an extra heavy fruit season, or in heavy snow storms.

This is the effect which we very frequently get in trees which have not been pruned with that point in view. This tree started with three branches with no space between them, and in an ice storm which ladened it down with sleet, the tree simply split apart and was made worthless.

This illustration unfortunately is not very clear, but it shows the same thing exactly. At this point the branch was broken over and falls away, which leaves a place in there for rot to start. The trunk of that tree in all probability is hollow.

In all young trees, so set, we prune back the tops not only to form the head of the tree at the point where we want it, but in order to counterbalance the root system which has been cut away, because in digging the trees the workmen destroy a considerable portion of the roots. This picture shows a nurseryman's team at work digging the trees. Eight horses are hauling the digging machine which you will see in the next slide.

This is the arrangement which is used for digging trees in nurseries. Not all nurserymen dig in that way, but this is the common way used in nurseries at the present time. It is an immense steel scoop arrangement with the front edge sharpened. This runs right along the row of the trees and simply cuts off all the roots that are on the inside of that steel scoop. For that reason you can readily see that a great many roots are cut off and that it is necessary to head back the top to correspond with the lost root system.

The next two or three slides show the condition of a young orchard when the heads have been properly trimmed. This happens to be in a pear orchard, but the illustration answers pretty well for our present ideas in apple orchard fruits. This tree is headed a little higher at this point than it need to be, but it is headed about right down here.

That tree is nicely formed and now has a large number of upright shoots. When the tree reaches that stage it is my idea in pruning that those branches should not be headed back. The first year's growth was headed at that point, and the next year at this point here, and the next year here. In a general way it was headed to about that line. In the last year of its growth it threw up all these single shoots. When a tree has reached that age my idea is the shoots should be thinned and not crowded too much; and if we head back at all we cut off just the tops. If we cut off here and here and here we will have the same growth we have down here, and down here, and again down here. We shall have cut back so much as to unbalance the root system. As a result we have a heavy wood growth and no formation of fruit buds, or very few. At this stage we shall have a greater growth of fruit buds if we simply thin out rather than cut back, and that stage should prevail for some time.

This picture is simply taken to show another orchard. This

is an apple orchard instead of a pear orchard, like the other, and this shows an orchard two or three years older than the last picture. This should be thinned just a little, and cut back a little.

Here is a stage we reach a little older, with the same type of tree. As you see, these trees are about as full of blossoms as they possibly can hold.

This illustrates practically the same point that I wanted to bring out before. This happens to be a plum tree instead of a pear tree. As you will see, it has a tendency to be an upright growth. Two or three years ago I started out to measure the wood that grew on several plum trees in the orchard at Durham, and this is one of the trees I measured up. It was my intention to prune the trees and measure the wood, but when I came to that tree I liked the looks of it so well that I decided not to prune it.

And that is what it did in two years; and you see that each one of those branches is just as full of little spurs as it possibly can be. That tree behaved in a most peculiar way. When it was first set out it was pruned to this point, and then to here. Then it grew from there to there, and from there to there, and from there to there, and from there to there the next season. The average growths were about thirty inches, and they were remarkably uniform, as you saw in the last picture.

The next year they made these growths, and those growths were not much more than half the length of the growth of the previous year. And this last year, mind you, the tree was thoroughly cultivated, and there are the growths it has made, which are less than half they were the previous year. The tree has been splendidly cared for, it has never had a check of any kind; it is a vigorously growing tree, but it has never been headed back from the time it reached that head which we wanted it to reach, and it is full of fruit buds.

Pruning is an individual tree problem. Various varieties must be handled in various ways. This particular tree shown here is a Wealthy. All it needs is a little trimming out of those branches, and a little heading in order to check it.

Here is a tree of an entirely different form. I was mistaken in saying that the last one was a Wealthy. That last one was a Wagener. This one is a Wealthy. This one needs very little,

except thinning out, but it needs less than the Wagener which was shown in the last picture.

This tree is a Baldwin, growing too vigorously. We would be afraid to cut back on that, because it would continue to grow very vigorously. That being so, we must trim it very moderately. By perhaps just clipping the ends of those branches and thinning it out we can get it to the shape we want.

This tree is a McIntosh, one of the nicest. This needs more thinning out.

These trees were five years from planting. They are of different shapes. The Wagener is upright. The Baldwin produces a large, thick, vigorous growth. This one is naturally spreading. If one were pruning this, in the course of a year or two he would begin to cut up the sides a little, so as to keep the tree a little more upright. If he were working out the Wagener he would thin out the centre and make it spread out to the sides.

This tree is to illustrate the formation of the head of the tree. This is at a stage where it is straggly and needs to be headed in somewhat to make it take a more upright course. If we did not head that in, with the weight of the fruit the branches would bend right over and come right down to the ground.

That is the same tree pruned back. You can see here the effect of it. Here is the effect of pruning that tree back which was in the way we saw it in the last picture.

This is a Burbank tree. That tree has been pruned as much as I want to prune it for this season — no, that was taken just before pruning. I want you to notice the difference between that tree and the next one.

Now, you see that there has been comparatively little taken off the tree. This is after pruning, and the other was before pruning, it is simply heading in the branches which were getting too long.

This is an apple tree at a later stage. It is still a comparatively young tree, but a tree that has long since reached the bearing age. It is too full of wood. Had this tree been pruned regularly every season a little bit it would not have reached that condition. It seems to me that that tree does not require very much pruning now.

There is the condition after pruning. A few branches in the centre, near the top, were taken out, causing the tree to spread out

and give a more open center; all through it comparatively small branches were removed, leaving it more open through all this part of the tree. The more noticeable condition, you observe, is cutting out a few branches in the center. A good many would think that tree has not been pruned sufficiently, but if that tree were trimmed back more it would next season throw up a great many water sprouts.

This picture is to show a good type of bearing apple tree. That is the sort of form we want. I would prefer to have the branches placed a little further apart right at this point; but it seems to me that there is quite a little difference between this point, and this point. That happens to be a very strong, well-shaped tree.

I think that my time is now up. I thank you very much for your attention, and at the close of the meeting I would be glad to answer questions. (Applause.)

Mr. Wheeler. Mr. H. L. Frost, of Arlington, will now speak for a few minutes on the spraying of fruit trees. Mr. Frost I do not think needs any introduction to a Boston audience.

SPRAYING.

By H. L. Frost, Arlington, Mass.

Ladies and gentlemen: I consider it an especially great honor to address the Massachusetts Horticultural Society, the oldest society in the country, and also to be invited to address you in company with Professors Sears and Pickett, who, without doubt, are the most expert in the culture of fruit of any one in the country. Your chairman, Mr. Wheeler, has been very skilful in his arrangement of the subjects today, giving Professor Sears probably the most difficult one, as he is working entirely in the dark when he is working underground. Professor Pickett has also followed him with a very difficult subject in the matter of pruning trees for the development of certain kinds of buds. The last subject is also well taken, because while it is the simplest operation in the care of trees it is the most important. You may fertilize the trees, and you may prune them to the greatest advantage, but if you do not

spray them all will be lost, because the tree will not survive; the operations may be successful, but the little insect will kill the patient.

The worst insect we have to deal with is the San José scale. I hold in my hand two apples which are peculiar. The owner of these trees had been spraying his trees for this insect for the last two or three years, but he had not been doing it very thoroughly. These apples were considered No. 1 apples. I am going to pass them through the audience, so that you may see the pink spots on the fruit, although the insect itself has been rubbed off. If you have fruit trees, the fruit of which is showing pink spots, you must be careful that the trees are properly sprayed.

I am going to show another one of the insects that has given us some damage, but not as much, but which is in the same class with the San José scale. This is a part of a young tree that was practically killed by the Scurfy scale. I will also pass them through the audience.

The first insect with which I will deal is the scale, a sucking insect. Insects are divided into two great classes, sucking insects and feeding insects. The scale insects are probably the most injurious in the country, the San José scale being scattered very nearly throughout the whole of North America. It is so small that it is not noticed until after the tree is very seriously injured. I question if there is an orchard in eastern Massachusetts and parts of the Berkshires, that is not more or less infested with this insect. That means that it is absolutely necessary to spray.

Our spraying materials are divided into two classes, insecticide and fungicide. The insecticide for the scale or sucking insect is also a good fungicide, thus we obtain results in two ways. I hold in my hand a piece of red dogwood which is badly infested with the San José scale, showing the insect. I am going to advise you to cut all the red dogwood or red osier on your farm. If you have it cultivated, be sure and spray it, as well as the fruit trees. For the scale insects we use either lime and sulphur or one of the forms of soluble oil.

I am going to show you today samples of both these insecticides and fungicides. This is a sample of commercial lime and sulphur which shows you a reddish color. If you make up your own lime and sulphur be sure and cook it until you obtain that color. There

are very few of us at the present time who can afford to make it, because as a commercial product it is sold so cheap. It is also a very difficult preparation to make.

Another insecticide for destroying the scale insect is soluble oil. There are several brands in the market, all of which are good. In my right hand I show you the oil before mixing with water. In my left hand I show you the oil after mixing with water, making a perfectly white emulsion. If you do not get that white emulsion, or get free oil on top of your solution, send it back to the dealer or manufacturer and demand that he replace it. For the scale insect, I find that it is easier, in my own experience, to destroy them with the oil than with the lime and sulphur, but without doubt the lime and sulphur is a better fungicide. If your fruit trees are in blossom never use lime and sulphur because it is most injurious to the fruit. My recommendations would be, on the first manifestation of scale, spray with oil until you get the scale under control. After you have got it pretty well under control you can use lime and sulphur a part of the time, possibly every other year. If you do not have the scale, I should use the lime and sulphur for the dormant spray. These two insecticides should be used when the trees are dormant, the oil at the rate of one gallon to twelve or fifteen gallons of water, the lime and sulphur at the rate of one gallon to nine or twelve gallons of water. These materials should never be used after the buds have opened. If you wish to use a fungicide on the foliage or fruit, you must use it very carefully, especially the commercial lime and sulphur. It should be used at the rate of one gallon to fifty or seventy-five gallons of water. Much injury has been caused the past year from the use of lime and sulphur, but I think it is due partly to spraying the foliage or fruit during the middle of the day when the sun is hot. If the weaker solution is used, I should recommend spraying in the early morning or late afternoon.

For the leaf-eating insects we use some form of arsenic, preferably arsenate of lead. The leaf-eating insects are very easily controlled with arsenate of lead; and if you want to use a fungicide, you can use the arsenate of lead with Bordeaux mixture, or lime and sulphur. In my own case I much prefer to have the tops of my trees sufficiently thinned out so as to give a free circulation of

air and plenty of sunlight. I believe that the most of our orchards, possibly barring a few varieties of fruit, can be handled perfectly well without using the summer fungicides, if the tops are thinned out enough. As you all know, the fungous diseases develop best in a moist atmosphere and in the shade. I have seen quantities of fruit grown perfectly free from any disease without any summer spraying or fungicide, especially where the tops were thin.

If you are spraying several times with both insecticide and fungicide and are getting good results, and when you cannot get the same results by using other methods, do not change. I know many people are spraying three, four, five and six times, and I would not want them to give it up for fear that they might get poorer results, if they are satisfied at the present time. But with the man who is going to start spraying, I don't want to discourage him. I believe if he will start in the winter or early spring with oil, or lime and sulphur, or he can use Bordeaux just before the buds open, if he has any San José scale or other scale insects, then spray again, after the fruit has formed, very thoroughly with arsenate of lead, that he will get good results.

I hold in my hand here samples of arsenate of lead, with which you are probably all acquainted. It is a very safe material to use, no matter what strength, and it can be used almost anywhere.

I have here a mixture of lime and sulphur, and arsenate of lead, which, as you will see, has turned black, which will be used by a great many up-to-date fruit growers the coming year.

I hold in my hand here a mixture of Bordeaux and arsenate of lead, a splendid material if you wish to use fungicide and insecticide combined for foliage and fruit spraying. All of these materials are well perfected and good materials.

To summarize all the spraying, I would recommend only winter spraying, and at least one spring spraying after the fruit is formed. In the eastern part of Massachusetts do not be afraid to use poison, as it is absolutely necessary to use the arsenate of lead much stronger in the gypsy moth area than it is outside of that area. You will see in many of the bulletins, especially those published in the western States, a recommendation of two pounds of arsenate of lead to fifty gallons of water. This is for the codling moth alone, and is doubtless plenty strong enough, but it is not strong enough for

the gypsy moth. In my own work I use the poison at the rate of one pound to ten gallons of water at the commencement of the season, and if the gypsy moth caterpillars are abundant I increase the strength every week, dropping off two gallons of water. I have used arsenate of lead at the rate of two pounds to one gallon of water with good results. However, I should not recommend that except in extreme cases, and I should not recommend the use of it at that strength except on rather dark days, or early in the morning or late in the afternoon.

The operation of spraying is a very simple operation, and need not frighten any one, especially if you have followed Prof. Pickett's advice as to pruning. If you contract for your spraying, do not try to hold your contractor down too low, as he is bound to get the best of you. Spraying is not a cheap operation, but it is an operation that will pay you a hundred-fold. If you get an outfit of your own, pay enough for it to buy strong apparatus. The equipment is very important and, if cared for, will last for many years. Mr. Hale, who has already been quoted, was asked to give the worst pest or enemy of the fruit-grower. One of those he considered the worst enemy was the other fellow. Are you going to be the other fellow, or are you going to be the fellow that raises good fruit? I wish that every one in New England would be the fellow who takes up his spraying and pruning and fertilizing, and in this way awaken every other fruit-grower who is the other fellow. I believe we can do it. I thank you for your attention.

The Chairman. The meeting is now open for discussion, and any questions that you would like to ask these experts, they will be pleased to answer them. Mr. Wheeler will take charge of the discussion.

Question. What are the best two varieties of pears for fillers?

Mr. Wheeler. Personally, I should say that the Seckel was one, which makes a rather small tree; and if I had to use a filler in a pear orchard I would say that the dwarf Bartlett would be another.

Question. I would like to ask a question in regard to selecting trees for different kinds of soil, for instance, the Baldwin and the Rhode Island Greening. What I would like to know is, would the Rhode Island Greening grow better in moist land than the Baldwin?

Prof. Sears. My opinion would be that the Rhode Island

Greening wants a much more moist and a heavier soil than the Baldwin. If you people are interested in soil, I want to invite you to come up to the Fruit-Growers' Convention, which is to be held at Worcester, and hear Mr. Wilder, the fruit expert at Washington, who spent last season making an orchard survey in this State.

It is my opinion that the Baldwin needs a much drier and not so heavy a soil as the Rhode Island Greening. The Greening wants a distinctly moist soil. The Hubbardston wants a still lighter soil, a still drier soil.

Question. Mr. Chairman, I noticed last summer a growth on the trees. The bark on this sample which I have is split, but I have a sample here, and I would like to show it to you.

Mr. Wheeler. I will ask Mr. Frost to examine that. That question was in relation to a wood growth that was found on the trees in the summer. It is probably the woolly aphis.

Mr. Frost. The sample here which the gentleman has brought forward is a twig which was infested with the woolly aphis and there are two nests of the tent caterpillar. The woolly aphis should be controlled by lime and sulphur or oil, which should be handled carefully. The young woolly aphis I handled very successfully last summer with a weak solution of lime and sulphur. I used one gallon to seventy gallons of water. With any kind of a spray in midsummer you must be very careful and not spray in the strong sunlight.

Question. Is it practical to graft a Bosc pear on to Kieffer pear stock?

Mr. Wheeler. The Kieffer pear is an oriental pear, while the Bosc is of French origin, and the two do not unite very well, but they will grow to a certain extent. I have several trees six or seven years old that bear very well. They make a poor union, and I would advise using Anjou and Bartlett and leaving the Bosc alone.

Question. What causes the semi-transparent, watery appearance in an apple? You have doubtless all noticed it. I have never discovered what caused it. A portion of the apple is transparent, and has a watery look.

Prof. Sears. It is undoubtedly what we call "water core." It is something I don't know anything about.

Mr. Frost. As I told Mr. Sears, I think it comes from soil conditions, and I do not think it is up to me to explain it, as he is the soil expert.

Prof. Sears. I don't think that it is fair to the audience to leave the matter in that way. I want to explain a little further my ignorance in the matter. I have seen it for a great many years. It is very common in the Tompkins-King variety. I never have heard any one — Mr. Frost is the first one to raise the question of soil conditions — I never heard any one with a theory about it. I have n't myself even a theory.

Question. You have seen the dark ring around the core of the Baldwin apple this year. I want to know what that is.

Mr. Wheeler. The question is, What is the dark coloration around the core of the apple at this time of year, the Baldwin? Do you know, Mr. Pickett?

Prof. Pickett. Mr. Chairman, that is one of the questions to which we cannot give a satisfactory answer. It is a natural breaking down or disintegration of the tissues, coming at this time of year. You will see it in the winter, many times, in the Northern Spy and other apples. It does not seem to be connected with rot. The only explanation that I have ever heard, that I would like to advance, is simply that it is natural disintegration and breaking down of the tissues.

Question. We have heard that the best soil for the Rhode Island Greening is a moist soil, and that a dry soil is better for Baldwins. I would like to know if any gentleman present can tell me the best kind of apples to plant on very light, sandy soil with a gravel sub-soil.

Mr. Wheeler. What do you think of that, Prof. Sears?

Prof. Sears. Mr. Chairman, the two varieties that I would suggest for that kind of a soil, from my observation, would be the Hubbardston and Wagener. I have seen those two growing very nicely on very light soil. The Hubbardston is a very well-recognized light-soil variety, and it grows very well on light soil. The third variety which I perhaps might mention, is the Tompkins-King, which grows on quite a range of soil, and which grows very nicely on light soil. We have that same kind of land which has been spoken of, and we have some Tompkins-King that do very well on that soil.

Question. Would the McIntosh do well on this same soil?

Prof. Sears. I think it would, Mr. Chairman, yes, fairly well, but I should not think that it was ideal McIntosh soil. I think the McIntosh ordinarily demands a little of the Baldwin soil.

Mr. Wheeler. I might say, in that connection, that on the end of Cape Cod Mr. Corey has an orchard growing in practically Cape Cod sand, and so far as I have seen his fruit I think he has got all the varieties that Prof. Sears has mentioned, and several others. Mr. Smith, of Ipswich, who will speak next Saturday, has such soil, and he is growing the Wealthy, McIntosh, and Rhode Island Greening on that kind of a soil, a very sandy soil, with a gravel sub-soil.

Question. Will a two or three-year-old apple tree from a nursery stand as severe cutting back as one a year old?

Prof. Pickett. You cannot head it back in the same way.

Question. I mean to get the low head.

Prof. Pickett. You cannot do that, because you won't have buds on the stem of the two or three-year-old tree as you have in the one-year-old tree. A few latent buds, or some of the largest buds that may arise, might perhaps throw up some stems, if the top were cut off, but you could not depend on where they would arise, or getting an even head from them. It can be done by cutting the whole top off before the buds start out and simply waiting until some sprouts appear near the base of the tree, and in that way you make a new tree from them.

Question. I want to know in order to get a well-headed orchard.

Prof. Pickett. You must start them with new trees, or, if not, a nursery that heads its trees low.

Question. That would be true of the pear?

Prof. Pickett. Yes. They do not make so much growth for the first year, but they are approximately the same.

The Secretary. One of the questions asked me perhaps more frequently than any other in the line of fruit growing is as to the age and size of trees suitable for planting in new orchards, whether they should be one, two, or three years old.

Mr. Wheeler. I think Prof. Sears can answer that readily, whether the trees shall be one, two, or three years old for new planting.

Prof. Sears. I agree with what Prof. Pickett said about heading trees. The first year we started our farm we tried to make low heads out of one-year-old trees. Since then, being very strong believers in low heads, we have bought entirely one-year trees. I think personally that aside from the question of low heads, I should favor one-year trees. You can get them cheaper, for one thing, and your nursery is not going to put on the market anything but the best and thriftiest growers. Out of a lot of trees he is going to pick and put on the market only the thrifty ones. And then I have always had a notion — this is merely theoretical — but I have had a notion that a one-year tree will stand transplanting a little more vigorously than a three-year-old tree. I know that some want to plant year-old trees and some older trees than that, and if they want to I am willing that they should. But I personally do not believe in anything older than two years old. If a person does not care for a low head, and does not care about the price, I think the two-year-old tree is all right, but if I must shape the plant, I should take the one-year-old tree. I suppose the reason why they want the older tree is that it is nearer the bearing age. I suppose sometimes that that is true, but I think, as a rule, the one-year-old tree will come in about as quickly as the two-year-old tree. I want to emphasize again what Prof. Pickett said about trying to make a two-year-old tree low-headed — you can't do it.

Question. Prof. Sears spoke about fertilizers. I want to know what are the best fertilizers, and the quantities to use, and when to use them.

Mr. Wheeler. Prof. Sears, will you tell us about that?

Prof. Sears. Mr. Chairman, it depends altogether on whom you consult, and what you think you ought to use, and how much. This covers a very wide range in every person's opinion, what ought to be used, and the quantities. I think we are all fairly well agreed that we want some amount of potash, and some kind of phosphoric acid, but you ought not to need it in the bearing orchard.

Now, on the other two fertilizers, the potash and phosphoric acid fertilizers, I should say that on the potash there are the sulphate of potash and muriate of potash, and there is also a third form, the low grade of sulphite of potash, but most people find themselves between muriate and sulphate. There is a lot of

experimental evidence, I think, in favor of the sulphate as against the muriate. The muriate is selling this year $10 a ton less than the sulphate, which is in favor of the muriate, but if the prices are running uniformly, as they usually do, I should say that the sulphate was the best. I should say in a bearing orchard that you ought to use two to three hundred pounds of that material. I think we are well agreed on the sulphate of potash. Of the phosphoric acid there are two or three forms, but I think basic slag is very good, which is the source of phosphoric acid. Of course you can have acid phosphate, and I think for young trees acid phosphate is the form to use, because in young trees the roots are rapidly moving out from year to year. In commercial orchards I might use basic slag, and they use from four to five hundred pounds, and up to a thousand pounds per acre. I think about an average of five hundred pounds per acre would be about right. Mr. Hale told me a few years ago that he was using five hundred pounds. I think three to four of phosphate of sulphur and five of bone meal would be about the average. The slag and bone meal, I should advise to put them on in the spring. They can be put on the first thing in the spring and plowed down. I should, of course, advise plowing them in. There are a few orchardists, and very few, who think they can, by reserving a part of their potash and putting on some the first of August, that it will do a little better, but I think that that is strictly theoretical. Yet those men are practical growers.

Question. Would you expect to put that amount of fertilizer on every year?

Prof. Sears. I think so, Mr. Chairman, yes. And that is the custom with these men I speak of, who fertilize year after year. They adopt some definite amount to put on, and put that amount on each year, whether they get a good crop or not — some more or less — but the quantity I suggest would be about as I have indicated.

Mr. Wheeler. There is one thing I want to add to that, and that is that lime of some form, I think, ought to be used, particularly in bearing orchards.

Question. I would like to ask how soon after the orchard is sprayed is it safe to cut the grass for use.

Mr. Wheeler. I will ask Mr. Frost to answer that.

Mr. Frost. Mr. Chairman, I cut the grass before I spray in every case. I don't think it is safe to use the grass after spraying with arsenate of lead, especially under the trees, because the rain does not reach the grass to any great extent, and the arsenate of lead adheres to the grass for a long time. I have found that a horse can eat poisoned hay without any injury, whereas a cow would be killed, and I cannot account for it. But the last few years in spraying, we invariably killed a cow, so we stopped using the grass, or cut it before we did any spraying.

Question. I would like to ask if you would prefer the fertilizer which Prof. Sears has mentioned to well-rotted barn manure.

Prof. Sears. Mr. Chairman, I think it is an entirely different fertilizer, which I should prefer for a bearing orchard, although I think a bearing orchard that can occasionally have a light application of barn manure will make the best orchard. I think a light application every two or three years of barn manure is perhaps a good thing, but barn manure contains a great deal of nitrogen, and if I was using barn manure I should want to use it with caution. I should say if you could put on, as I have suggested, barn manure every three years, a light application, and in between use cover crops, and then perhaps using the quantities I have suggested of the other two fertilizers, you would have very nearly ideal conditions for running an orchard.

Question. I would like to ask Prof. Sears what his opinion is of mineral fertilizer which we hear so much about these days.

Prof. Sears. I think I better perhaps say that I know nothing about it and sit down. All I know about it is what I have read in the circular put out by the company that sells this material. It is not fair to criticise the concern, but it did seem to me if their fertilizer would do what they claim for it that there was n't any use of anybody else staying in the business.

Question. I want to ask a question, Mr. Chairman, whether you prefer the unground lime, which I suppose is carbonate of lime, to gypsum, which is sulphate of lime.

Mr. Wheeler. I have never used any gypsum; I prefer the other, so far as I know it.

Question. I want to ask another question: Whether anybody

has had any practical experience or knowledge about digging the holes for setting trees with dynamite?

Mr. Wheeler. The question is asked whether it is of advantage to blow out the holes for setting trees with dynamite. I think one of you three gentlemen has seen that done. Have you seen that, Mr. Frost?

Mr. Frost. I have seen it and I have tried it, and it depends entirely on what the subsoil consists of. If you have a hard subsoil, or hardpan, I think it is very advisable to use dynamite for planting. It not only breaks up the subsoil and makes a better trench, but it makes it easier to dig the holes. The method of using it is to punch a hole with a crowbar about thirty inches and use from a quarter to half a stick, and then explode it. With a hard subsoil you get better results and a quicker growth in the tree.

Question. I would like to ask if Newtown Pippin would be a desirable apple in this section for export.

Mr. Wheeler. The question is asked if the Newtown Pippin would be a desirable apple for export. I will call upon Prof. Pickett.

Prof. Pickett. I do not feel qualified to answer the question, because I have not seen it grown enough in New England to say. Day before yesterday a gentleman from New Hampshire wrote in and asked me that question, and he said that he would like to grow it because he had two or three trees in his orchard that were doing splendidly. His orchard is in Concord, New Hampshire. I should think that was too far north to get good results, but you are 75 miles south of that, and I am rather of the opinion that it would be a valuable variety and worth trying out; but the authorities on varieties for Massachusetts have not highly recommended it or included it in their list of commercial varieties. I have seen it in New Hampshire and at least half a dozen different places doing well in every case. This man said that he would like to use it, and I thought it was a fair one to use in the place of Baldwins, and I wish heartily that I could tell him it was a better variety than a Baldwin, but I could not tell him that.

Question. Will you give us the history and origin of the Baldwin apple?

Mr. Wheeler. We have up stairs a very complete library on all

horticultural subjects, and I think our librarian could find a book or pamphlet which would describe that sufficiently. It would be quite a story to go into, and I don't think we have the time for it this afternoon.

Question. Can any of the gentlemen give us advice as to the best conditions under which to keep apples? Very fine apples, good looking apples in the fall when they are picked frequently go to pieces and rot. Is the trouble the condition of keeping or the fungous conditions of the trees?

Mr. Wheeler. The question is asked as to the best method of keeping apples. Prof. Sears has just had a fine storage plant built on the grounds in Amherst, and I think he is in a good position to answer that question.

Prof. Sears. I will ask Prof. Pickett to answer it.

Prof. Pickett. I have no objection to answering that. The keeping qualities of apples depend on a great many things. First, the variety; second, on the stage of maturity in which they are picked; third, the weather when they are picked; fourth, on the disease or fungous growth that may have checked the apple; fifth, upon the temperature of the storage and the moist or dry conditions; sixth, the celerity in which the fruit is got into storage; and then the chance for infection.

I think I know what that man has in mind. I have no friends up in Durham this winter at all, because I sold them some nice looking apples last fall, and they did not keep very well. They were Baldwin apples, and they looked fine when they were sold; they were unusually large in size, but a great many of them went soft within a short time. I laid that to weather conditions during the summer and to over-maturity at the time of picking. We had a very dry, hot summer that had a tendency to mature the apples earlier. We however left them and picked them at the ordinary time, and I am pretty well satisfied now that they were at least two weeks beyond the ordinary maturity when they were picked, and as a result of that they went down in storage and spoiled very rapidly. There wasn't any brown rot or any ordinary black rot on the apple, any of them. They just simply went to pieces. You could take one in your hand and squeeze it, and it would squash right up. Many of them had the brown core which one of the gentlemen inquired about.

The ideal stage at which apples should be picked is when they have reached a perfectly sound condition, and then they should be stored just as quickly as you can get them into storage after they come off the tree. They should not be stored in open bins. They should not be disturbed and picked over in the barrels, if you can help it. Picking them over is a good way to spread the rot spores. If they are wrapped in individual papers the spores will not be able to spread from one apple to another.

Question. What is the temperature at which apples should be stored?

Prof. Pickett. Apples are safe at 30 degrees. The juice of the apple freezes at about 28½ or 29 degrees. It is a little thicker than water, and freezes at a little lower temperature than water. The cold storage authorities say 31 degrees, and I think that can be taken as very accurate indeed. In fact, I know of some experiments, both published and unpublished, which say that 31 degrees is the ideal temperature in which to store apples. Apples keep very nicely if they are removed directly from picking to storage in a temperature of from 27 to 28 degrees, if they belong to the good keeping greenings; the Ben Davis will keep until June or July.

Mr. Frost. This morning I saw some Baldwin apples in Danvers and the owner of those apples said that last week he picked over sixty barrels and got less than a peck of specked apples. I think this bears out what Prof. Pickett says. These apples were good but very small, and came from trees which I think had fully matured. From what I have seen this winter, I think last year was a hard year on orchards which had been under cultivation, but it was a good year for neglected orchards. These apples I saw this morning were surely from a neglected orchard.

Question. I would like to ask if there are any of the newer peaches that approach the Elberta as a commercial peach.

Prof. Sears. Mr. Chairman, I don't suppose there is any kind of a peach that you can make as much out of as the Elberta, but the white peach is far better to eat than the yellow peach. The Carman and Belle of Georgia are far superior to eat to the Elberta. I think the Elberta is a good peach to sell, but I don't want Mrs. Sears to can any Elbertas. I want something else.

Question. Under ordinary conditions what is a low-head tree, how many inches from the ground?

Prof. Pickett. The lowest of the low-head apple tree is when the first branch rises about twelve inches, but they would be considered low-head if the first branch rose anywhere from twelve to twenty-four inches. In peach trees, perhaps it is ideal to have the peach tree as near the ground as possible, just as far down as you can get them. That would be the ideal place for low-head peaches.

Question. I would like to ask what should be the strength of oil for spraying on flowering shrubs.

Mr. Frost. It is safe to say 1 to 12.

Question. Is the Ben Davis a desirable grafting stock?

Prof. Pickett. I consider it a very desirable grafting stock, but if I were to plant on purpose for grafting I would plant the Northern Spy, but if I had the Ben Davis planted I should consider it a good grafting stock.

Question. I have several Duchess and several hundred Northern Spys and several hundred Ben Davis which I would like to graft, if they were a desirable stock.

Prof. Pickett. Yes, they are very desirable.

The Chairman. The meeting is now adjourned to next week Saturday at 2 P. M.

PLANNING AND PLANTING AN ORCHARD.

By Fred A. Smith, Ipswich, Mass.

Delivered before the Society, March 9, 1912.

(Author's Abstract).

As a result of the holding of the New England Fruit Shows together with the constant attention and space given fruit discussions and orchard subjects in our horticultural and agricultural magazines and even in the Sunday and daily papers, we find ourselves witnessing an unusually keen interest all over New England in the subject of fruit growing. This has resulted in the attempted renovations and better care of old orchards and a greatly increased planting of new orchards.

In planting a young orchard, particularly of apples, the first consideration is the choice of a location. This is often predetermined; that is, if the farm or site is already purchased.

Concerning the soil, practically all except the lightest of sands and heavy clays are adapted under certain other conditions for the growth of apples.

The elevation is important; if possible avoid low and flat land; secure at least a slight elevation above the general level. It is not desirable often to select the greater elevations, for the exposure to high winds may cause serious loss of fruit.

The question of slope of land or exposure as regards the point of compass is not so important as often considered.

In the preparation of the orchard site a few years of good cultivation — as good as for a crop of corn or potatoes — is desirable, and thoroughness in this detail may often mean much in the success of the future orchard. One can safely plant, however, in a recently cut over tract or in sprout land if he is willing to give the necessary attention to the subsequent care and treatment. There are

various systems of arrangement in planting designed to simplify cultivation and give the best opportunity for the tree to make the fullest development of head and root system, and at the same time make the best use of the land. In order that we may make the best use of the land it is often desirable to plant trees closer than they should finally stand and as a result the so called filler system has been developed. This consists of planting an early bearing and necessarily shorter lived variety of apple between the permanent trees. Thus if permanent trees were planted at 40 ft. in each direction and a filler system used, we should have

27 permanent trees per acre
81 filler " " "

108 total

The great danger in this system is in the fact that the average owner may not have the courage to remove all or at least a part of the filler trees at the right time before any injury from overcrowding may result. The filler trees must be removed by the time the outer branches touch. And now let us consider the stock to plant. Where shall we buy? Of the nearest nursery or of one in which we have confidence. When shall we buy? Early; preferably in early fall whether we intend to plant in spring or fall. What age? Usually two-year-old trees of the better grades.

In choosing varieties one should be governed by at least three considerations; one's personal preference; adaptability of variety to the region and special farm soil; and the demands of the market in which one expects to market his fruit.

And now concerning the planting details. When the stock arrives, if from a nearby nursery, it will probably be in the best of condition. If from a distance open and unpack at once. The bundles of trees should be buried partly or wholly in the moist soil. If the planting is to be delayed the bundles should be opened and the trees well "heeled in."

In this latitude and climate we should not hesitate to plant apples and pears in the fall; but not the stone fruits. There are in fact many arguments favorable to the fall planting, as dryer soil, more time, the tree becomes better established and makes a far better growth the first season.

In laying out an orchard, if extensive or if the land is very uneven, it is desirable to use a transit and lay out base lines at right angles. There are several methods in use for locating the individual tree, but the plan of sighting in stakes from the opposite direction is one of the best. Good generous holes are then dug, taking care to separate the loam and the subsoil.

After shortening any broken roots, the tree is located by means of the planting board. Use considerable care in filling the hole, aiming to fill all spaces among the roots, and firm the dirt evenly, taking care to reverse the order, filling in the loam first and finishing with the subsoil. The tree can well be set two or three inches lower than it stood in the nursery row. It is a mistake to use any stable manure in the holes when planting a tree, although there is seldom any objection to using some as a mulch on the surface.

After the planting is completed the next operation is the pruning. Do not prune a young newly-set tree in the fall. This should be severe the first time and is especially necessary owing to the greatly reduced root system caused by digging the tree from nursery row. The subsequent shaping and pruning need not be so severe. The tendency of late is to start the limbs much nearer the ground. Nurserymen are now heading the trees in the nursery rows much lower than formerly.

One of the serious difficulties for the orchardist has been the injury by mice, rabbits, woodchucks, etc. These can be driven away by washes and sprays and even by wrapping the trunks with building paper, and wood veneers. Often tramping the loose snow about a tree will discourage the mice.

Considering fertilizers for a young orchard, unless the soil is very poor and worn out, I do not believe much special fertilization will be necessary until the trees come into bearing, when a much more thorough system should be practiced. Cultivation should be early, frequent, and thorough in a young orchard. Under no consideration should we let an orchard become crippled for lack of ample cultivation. There is no objection to intercropping with annual crops, if a crop is grown which matures early. Crops like squash, early potatoes, beans, or peas, and perhaps corn are all right for this purpose. Cover crops play a very important part in modern orchard management. Leguminous plants are very

desirable — clovers, field peas, or winter vetch. Also of the non-leguminous plants — rye, oats, barley, turnips, and buckwheat are valuable. In this connection weeds are not to be disregarded.

Cover crops serve the following purposes: withhold moisture from trees, preventing late growth; conserve plant food; prevent soil washing; temper severe freezing of soil; hold foliage from trees for manurial purposes; add humus to soil; and increase water holding power.

Spraying should be just as regularly and faithfully followed in the first years as when the bearing age is reached. The statement that spraying is orchard insurance is not far from right.

There is a tendency at the present time to overdo the orchard planting business. As a suggestion it would be well for the prospective planter to consider seriously the advisability of planting half the number or acreage and on this concentrated plantation center all his energy, greatly to the advantage and improvement of the crop.

Discussion.

Question. Is the spraying of the bark of fruit trees worth while?

Lecturer. A more modern method is spraying the bark with lime-sulphur solution which helps to keep the bark clean. An over-zealous person is apt to go too deep in scraping.

Question. Can the Delicious apple be grown successfully in Massachusetts?

Lecturer. Beyond the extent of one or two trees I would pass it by.

Question. When should we spray with lime-sulphur?

Lecturer. All the time and at all seasons. The lime-sulphur spraying is now proving much more satisfactory than ever.

Question. Is there any advantage in the use of dynamite for fruit tree-planting?

Lecturer. I have had no personal experience with it. It may be helpful in some soils but is unnecessary in other soils.

Question. How many trees forty feet apart can be planted on an acre?

Lecturer. Twenty-seven.

Question. Do you recommend peaches as fillers in a young orchard?

Lecturer. I would not recommend them, although the plan has strong advocates as well as opponents. The spraying and cultivation are so different that it is not desirable. I am much opposed to the use of peaches as fillers in the orchard.

Question. How do the so-called miscible oils compare with lime-sulphur?

Lecturer. They are both used principally for the same purpose — the control of the scale insects and both are effectual. The oil spray should be used in the fall as soon as the foliage is shed and in the winter when the trees are in a dormant condition. The oil has an advantage that it spreads a little faster and the lime-sulphur is very hard on the individual applying it.

Question. How late in the fall would you recommend planting trees?

Lecturer. As late as the ground can be worked.

Question. What general line of fertilizers would you recommend for an orchard just coming into bearing?

Lecturer. Basic slag, muriate of potash, and nitrate of soda.

Question. In what proportion would you use them?

Lecturer. Each orchard is an individual case.

Question. For what fungous disease do you consider lime-sulphur a remedy?

Lecturer. For the apple scab principally although this has not been so serious in late years as formerly.

Question. Is there any traction power apparatus with low wheels suitable for working large tracts of land?

Lecturer. There have been steam plows and other machines invented for this purpose, but thus far there appears to be nothing suitable for orchard work. It would be very desirable to have such machines for it requires a lot of help to cultivate an orchard and it is getting to be a serious matter.

Question. What line of proceeding as regards pruning and fertilizing would you recommend for an old orchard that has had nothing done to it for twenty years?

Lecturer. I would begin with a slow cultivation; disc harrow first season freely and frequently and follow up with heavy pruning.

Question. How can the green aphis be controlled?

Lecturer. Kerosene emulsion spray much diluted will keep them down although lime-sulphur is better but more troublesome to apply.

Question. To what extent would you practice summer thinning of fruits.

Lecturer. Begin thinning early varieties like Duchess and Yellow Transparent about June 24. This can be carried on for a long period. I have practised thinning to a considerable extent and am well satisfied with the results, but did not have the courage to go far enough.

Question. Is lime of any service in an old orchard?

Lecturer. Yes, indeed. Lime is valuable in the forming of wood and in overcoming moss growth.

Question. How deep should the orchard be plowed or cultivated?

Lecturer. It is not necessary to move a great amount of soil. Only loosen the top soil.

MY FOURTH EXPEDITION TO CHINA.

Being some account of the Arnold Arboretum's Second Expedition in quest of New Plants. With 100 Stereopticon Views.

By E. H. Wilson.

Delivered before the Society, March 16, 1912.

On the Arnold Aboretum's first expedition to Western China (my third in all) a large number of new kinds of conifers was discovered, but unfortunately the season was unfavorable and seeds of the Pines only were obtainable. The herbarium material collected demonstrated that the Chino-Thibetan borderland was the headquarters of the Spruce family, a fact previously unsuspected by the scientific world. Exactly how many species occur there cannot be determined until the material collected is systematically named and described, but it may be put down as between twenty to twenty-five distinct species. As spruce timber is of considerable economic value, the commercial importance of this discovery will be readily appreciated. Furthermore, from the altitude at which these new spruces were found and the climatic conditions which obtain there, we have good reason for believing that the majority will prove hardy and amenable to cultivation here in New England.

The Director of the Arnold Arboretum, Prof. C. S. Sargent, at once realized the potential value of this discovery, and that forestry and horticulture might have opportunity of testing these new conifers promoted a second expedition to Western China. This expedition, my fourth in all, is the one I am about to talk with you upon. The special object, then, of this expedition was to introduce to the Arnold Arboretum, and incidentally to horticulture in general, as many as possible of these new conifers. But aside from the main object, the securing of seeds of any other kind

of plant, new or interesting, was also part of the program. By special arrangement with the Arnold Arboretum, lily bulbs in quantity were to be collected for Messrs. R. & J. Farquhar of this city. (In the exhibition hall adjoining this room, this firm has amongst its magnificent exhibit a number of the lilies grown from bulbs secured on this expedition. The beauty and value of these new lilies need no comment and one need not be a prophet to foreshadow for them an appreciative public. They are perfectly hardy here in Massachusetts and thrive under cultivation).

With the above objects in view I sailed from New York on April 2d, 1910. Some little time was spent in England making certain necessary arrangements, and then I traveled via the Trans-Siberian Railway to Peking. From Peking I went by rail to Hankow on the Yangtse River. At Hankow steamer accommodation was available to Ichang, a city situated in the heart of China on the Yangtse River, one thousand geographical miles from its mouth. Ichang having been my base on three previous occasions was well known to me and no difficulty was experienced in securing carriers and outfit necessary for a long overland journey. My former employes were notified and inside of two weeks from date of arrival my arrangements were complete.

Western China is most readily reached by journeying up the river in native boats, but with the object the expedition had in view, an overland route was necessary. My object was to enter Szechuan by way of northwestern Hupeh and then strike due west to Chengtu, the capital of the Province. Much of this proposed route was absolute terra-incognita, and no one had before attempted this journey in its entirety. The distance is about seven hundred miles, but in rough mountainous country mere mileage is no criterion. In all it took about eight weeks of steady travel to cover the distance, but once we entered Szechuan our task proved comparatively easy.

Northwestern Hupeh is today one of the wildest, most sparsely inhabited and least known parts of China. It is simply one vast sea of mountains; range upon range of razor-backed ridges, separated by narrow chasms down which mountain torrents rage in mad impetus. This inaccessible country supports a rich flora and is one of the most interesting parts of China. The following

extracts from my diary may, perhaps, convey some idea of the wealth of vegetation found in this region.

"The mountains are clad with Oak (largely scrub), *Pinus Massoniana* and Cypress. A few Keteleeria trees occur and also *Liquidambar formosana*. *Populus silvestrii* with its light grey bark was a very common tree. Wood-oil trees were a wonderful sight and most abundant. In the ravine they were in full leaf and the fruits swelling, but from fifteen hundred feet up to three thousand feet they were leafless and covered in flowers. By the side of streams at low altitudes *Rosa multiflora* was a pretty sight with its white and pink blossoms, but the Musk Rose was the flower of the day — bushes six to twenty feet tall and more in diameter, nothing but tresses of white, fragrant flowers. On some old graves I gathered a sulphur-yellow flowered form of *Rosa Banksiae;* this I think must have been planted. Rose bushes are a special feature in these parts and numerically are the commonest of shrubs. Around our houses the hardy rubber tree (*Eucommia ulmoides*) is cultivated for its bark, which is a valued tonic medicine. Facing our lodgings is a massive peak called Wan-tiao-shan; its face a sheer precipice of hard limestone, the summit and farther slopes apparently well forested. The people of this place, like the country people everywhere in these parts, are extremely nice and obliging and it is a real pleasure to be amongst them.

Wan-tiao-shan looked too tempting to be passed by without investigation and we spent the day, and a very hard day too, in its ascent and descent. Leaving our lodgings at 6.30 A. M. several hours were spent rounding the spurs and surmounting the cultivated and scrub-clad land which subtend the mountain proper. At six thousand feet we reach bamboo-scrub; a path through this leads to an abandoned Huang-lien cultivation where medicinal Rhubarb is now cultivated, and the drug Tangshen extraordinarily abundant. At six thousand five hundred feet we enter the timber. At the margin of the timber to the left of the road are extensive plantations of the drug Huang-lien. This interesting plant (*Coptis chinensis*) is grown under a framework of brushwood reared some three to four feet above the ground. The drug is used as a tonic and blood-purifier.

As the path winds the timber is at first small with plenty of

bamboo-scrub, but this belt is very narrow and speedily gives place to large trees which extend to within five hundred feet of the summit where bamboo-scrub again becomes troublesome. Everywhere above five thousand feet where the woods are thin and sunlight penetrates freely bamboo-scrub is found, rendering travel excessively arduous, and unless a path is cut, impossible. In the dense shade of the forest the Bamboo does not thrive.

The forest is full of splendid timber and is rich in variety. The Chinese Beech, perhaps, is the commonest tree. This species always has many trunks, and trees sixty to seventy feet high with trunks three to six feet in girth abound. The interesting *Tetracentron sinense* is very abundant, and trees sixty to seventy feet by eight to ten feet girth are plentiful. The leafage of this tree is very thin and characteristic. Huge trees of White Birch occur and good-sized trees of several species of Maple are scattered through the forest. Davidia occurs sparingly, and large trees of various cherries, bird-cherries, mountain-ash, and wild pears are common. *Berchemia flavescens* rambles over the tops of the tallest trees; several species of Rhododendron are met with and one, *R. sutchuenense*, forms a tree thirty feet and more tall and five feet in girth. Shrubs in variety abound; in glades *Viburnum tomentosum* was wreathed in snow-white. In more open places the Musk Rose is rampant and near the summit *Rosa sericea* abounds. Three kinds of Rhododendron were collected and six in all noted. Maples were very common in numerous variety, but one large tree of *Acer griseum*, with its chestnut-red bark exfoliating like a river birch was the gem of all. Various Pomaceae not yet in flower and one or two species of Lauraceae made up a fair percentage of the small trees. Viburnums in variety, Honeysuckles, Diervillas, Deutzias, Philadelphus, and *Neillia sinensis* were everywhere abundant. In rocky, more open places, *Viburnum rhytidophyllum* with its long, thick wrinkled leaves looked particularly happy, and in fully exposed places *Malus baccata* with its wealth of pink flowers was a sight for the gods. On wet, humus-clad rocks, *Pleione Henryi* luxuriates and herbs in endless variety crowd every available spot. A fine torrent collects up the waters of countless small streams, and falls down the narrow ravine often in a series of waterfalls hundreds of feet high, the noise of the falling water alone breaking the silence of the forest depths.

The next day we go over and investigate some Davidia trees and the forest generally, crossing a narrow neck a wood-cutter's circuitous path leads us down to a narrow defile through a fine shady wood. Ascending a precipice with difficulty, we soon reach the Davidia trees. There are over a score of them growing on a steep rocky declivity; they vary from thirty-five to sixty feet in height and the largest is six feet in girth. Being in a dense wood they are bare of branches for half their height but their presence is readily detected by the numerous white bracts which have fallen and lie strewn over the ground. The tree starts up from below when felled, indeed it naturally throws up small stems after it gets old. The bark is dark and scales off in small irregular flakes. By climbing a large Tetracentron tree growing on the edge of a cliff and chopping off some branches to make a clear space I managed to take some snapshots of the upper part of the Davidia tree in full flower. The task was difficult and highly dangerous. Three of us got up the tree to different heights and the axe and camera were hauled up from one to another by means of a rope. The wood of Tetracentron is brittle and I felt ill at ease astride a branch about four inches thick with a sheer drop of a couple of hundred feet beneath me. The beauty of the Davidia is in the two snow-white connate bracts which subtend the flower proper. These are always unequal in size; the largest is usually six inches long by three inches broad and the smaller three and a half inches by two and a half inches; they range up to eight inches by four inches and five inches by three inches. At first green they become pure white as the flower matures, and change to brown with age. The flowers and their attendant bracts are pendulous on fairly long stalks and when stirred by the slightest breeze they resemble huge butterflies hovering amongst the trees. The bracts are somewhat boat-shaped and flimsy in texture, and the leaves often hide them considerably, but so freely are they borne that the tree looks from a distance as if flecked with snow. On dull days and in early morning and evening the bracts are most conspicuous, and often in this light trees resemble pyramids thickly covered with huge snowflakes. The fruit resembles a small walnut, but the inner shell is absolutely unbreakable. To my mind this is at once the most interesting and beautiful of all trees of the north temperate flora.

Side by side with the Davidia is a good-sized tree (fifty feet by four feet girth) of the Chinese Horse-Chestnut. Hornbeam and Tetracentron are common and higher up Birch, White, Red and Black luxuriate. Maples are a feature of these woods, all tall trees but of no great thickness. Beech is numerically perhaps the commonest tree in these forests, part of it being formed entirely of these trees. So light demanding are they that they suffer no competitors or even undergrowth. For the first time in my travels I am able to say definitely that there are two distinct species in this region. One forms a tree with a single trunk, the other always has several trunks. The former species has glabrous, shining green leaves, with a large, dense, much-branched head; it makes a tree forty to fifty feet high with a trunk five to ten feet in girth and, save for its smaller stature, very strongly resembles the European Beech. The other species, which is the recognized Chinese Beech, grows much taller but never attains the girth of the other. It generally has six to twelve trunks averaging two to five feet in girth, arising closely together and slanting away from one another as they grow. The bark is light grey and the leaves sub-glaucous and hairy below; branches somewhat ascending but with the young branchlets slender and pendulous. A local name for the Beech is "Peh-li-tzu." Small plants were common but no flowers were to be discovered.

In the shade of trees a black currant (*Ribes longeracemosa* var. *Wilsonii*) with racemes one to one and a half feet long is common, whilst *Rodgersia aesculifolia* with its large, erect, thyrsoid panicles of white flowers is rampant.

Five species of oak, three deciduous and two evergreen occur. *Meliosma Veitchiorum* and many species of Pomaceae and Cherries are common, while the Varnish tree is everywhere abundant. In dense shade various evergreen Barberries occur and in open country *Neillia sinensis* forms dense thickets.

Of conifers *Pinus Armandii* and *P. densiflora* are scattered over the cliffs; *Picea Wilsonii* and a flat-leaved Spruce are rare, whilst the Hemlock Spruce is fairly common — neat, dense trees of no great size with their young leaves just unfolding and old cones abundant. The white Pine (*P. Armandii*) is more common higher up on the mountains; with its long needles, graceful port,

and light grey bark this tree is strikingly handsome; the cones are pendulous borne at the ends of the branches. The wood is very resinous and is used locally for torches, burning with a clear bright flame, giving a good light."

On the evening of June 25th, 1910, we reached the summit of the last barrier range separating the wilds of Hupeh from the less elevated and more prosperous region of Eastern Szechuan. For twenty-two consecutive days my followers and self had struggled through mountain fastnesses over the vilest of roads, often more or less destroyed by torrents in spate, and endured considerable hardship from bad accommodation and lack of food supplies. One and all were hungry for an easier road and the flesh-pots Chinese villages and towns afford. Our quarters for the night were two miserable, half-ruinous houses which constitute the hamlet of Hsao-pingsze (little flat); altitude 5800 feet. On three sides stupendous cliffs rear themselves; the fourth is a gap, the edge of a precipice, down which the road passes. From the gap we obtained one of the most wonderful views my eyes ever beheld. Below us, some 4000 feet the morrow proved, yet seemingly at our feet, lay a small village with a considerable river flowing past it. Beyond the river ridge upon ridge, sharp-edged, 5000–6000 feet high, bare and absolutely treeless, with higher peaks outstanding and mightier ranges in the far distance. The rocks, chiefly limestone, showed white, grey, and reddish and added a bizarre appearance to the cliff ridges. I do not ever remember looking upon a more savage and less inviting region. A thunderstorm was brewing and the light rapidly failing rendered photography impossible. But no photograph could convey any adequate idea of the savage grandeur of the whole scene; it was indeed sufficient to awe and terrorize one. Such scenes sink deep into the soul and a stillness creeps over one leaving an indelible impression which time cannot efface. Angry rain clouds soon blotted out the scene and the storm burst. The roof of our hovel was like a sieve and the mud floor quickly became reduced to a quagmire. To keep dry was impossible and we all huddled together to keep warm, and so passed the long night.

We escaped from these miserable quarters soon after daybreak next morning; rain was still falling and from the gap nothing

was visible but an ocean of cloud banks. The descent was precipitous and for the first two thousand feet we fairly tumbled down; afterwards it became a little easier. Reaching the river we crossed by ferry to the village we saw from the heights above. The river flows between vertical cliffs and from a point just below the ferry to Taning Hsien, ten miles distant, there is neither house nor hovel. To cover this distance we engage boats, narrow, lightly built affairs, turned up at prow and stern with long sweeps projected fore and aft for steering purposes. The current is strong and rapids numerous; aided by a freshet we cover the distance inside of half an hour. The brief journey was through one grand chasm, with walls of rock sheer to the water's edge, allowing no space even for a shingle-bank to establish itself. The sides of the chasm are treeless and mostly bare, with here and there odd patches of grass and clumps of the graceful bamboo (*Phyllostachys flexuosa*). A road skirts the right bank of the river zigzagging around the cliff well above highwater mark, every inch of it blasted from the solid adamantine rock. Salt wells occur in the vicinity, and this road, evidently one of the ancient arteries of China, probably owes its origin to the discovery of these wells long, long ago. Today it is very little used, but it is of such a nature that time and neglect can effect but little.

From Taning Hsien to Chengtu occupied about five weeks, and was full of interest but we have not time to dilate upon it here.

At Chengtu after a few days' rest, a new caravan was organized for the purpose of penetrating into the wild and little known country which forms the hinter-land between China proper and the Thibetan plateau. This region agrees with western Hupeh in the absence of decent roads, but the mountain ranges are much higher and culminate in peaks clad with eternal snow. Fascinating beyond description is this rugged region but the difficulties of travel are many, and the need of roads is keenly felt. The following extract from my diary may be interesting as bearing upon this point:

" I was under the impression that I had long ago reached bedrock in the matter of bad roads; today I have been disillusioned. The road today absolutely defies description. We have done nothing else all day but scramble over rocks, circumvent landslips

at considerable risk, wade through streams, dodge waterfalls and flounder through mud. To end matters, we fetch up for the night at the most miserable of hovels, and as our loads fail to arrive we have to pass the night supperless, with a bare plank for a bed. Luckily I had one blanket with me and with a bundle of 'driers' (i. e. pads of paper) for a pillow soon got to sleep. About midnight I was awakened by a rainstorm, to find myself more or less drenched through. There was no really dry spot in the hovel and we passed the rest of the night huddled together around the embers of a small fire. Dawn ultimately broke and the rain finally ceased, to be followed by welcome, life-sustaining sunshine. The scenery in this region is magnificent and in the ravine we are now attempting to explore savage and grand vertical walls of rock, clothed in vegetation, with cascades and waterfalls are everywhere. The stream which flows through the bottom of the ravine is in spate and is simply one roaring, rushing mass of foam and spray. Vegetation is most luxuriant, but an aeroplane would be necessary to properly explore it. The higher slopes are clad with various conifers, all of them fruiting freely to my great delight. Near the water's edge strong growing herbs abound, and especially striking are Senecios in variety, *Astilbe Davidii*, and various species of Aconitum. Shrubs are everywhere rampant and wild Roses, Honeysuckles, Spiraeas, Viburnums, and allied plants run riot in species."

Such then is the nature of the country in far western China and it is only in such inaccessible parts that forests are to be found today. Everywhere in China where it is possible to cultivate a crop of foodstuffs the forests have been cleared away. But much as we deplore this destruction, it should be borne in mind that necessity and not wantonness has been the cause. If taxed, the Chinese have a more legitimate answer to make in the matter of forest-destruction than we have, and with sorrow we confess it, the people of this country. Here we have squandered our forest wealth in a comparatively few years, and necessity has had less to do with its disappearance than wanton carelessness. The destruction of a country's forests, from no matter what cause, brings condign punishment in its wake. The character of the climate is changed, tending more towards extremes; drought and floods

bringing with them famine and pestilence, landslips and the obstruction of rivers due to detritus, all follow the disappearance of a country's forest wealth. The price has to be paid, there is no alternative. Natural laws admit of no corruption; they are inviolable and inexorable. But we digress:—The fruiting of conifers is always uncertain and it was with the keenest pleasure that I found them fruiting abundantly. Everything depended upon this, for it is only with great difficulty that seedling plants can be transported such long distances. In reference to this matter it may be interesting to record the fact that quite a number of small plants of Spruce and Silver Fir packed in sphagnum moss, survived the long journey and are now growing in the nurseries of the Arnold Arboretum. But with abundant seed it was not necessary to send many living plants. In all, seeds of some fifty numbers of different conifers were despatched and, thanks to prompt and proper attention, every one of them is at this moment growing in the Arboretum and elsewhere. In addition to the conifers, seeds of some three hundred and fifty miscellaneous trees and shrubs were collected and most of them are growing away freely. Perhaps the greatest surprise of the expedition was the discovery of an entirely new species of Peach. This is about the last thing one would have expected to crop up anywhere, but the investigation of the Chinese flora has resulted in so many remarkable discoveries that botanists nowadays are scarcely surprised at anything.

Living plants of the Chinese Sassafras, the two Beeches, many Willows and Poplars safely withstood transportation and are now added to the Arboretum collections. Several thousands of lily bulbs were collected and after much difficulty and anxiety, safely delivered into the hands of the Messrs. Farquhar.

I returned via the Canadian-Pacific route, and reached Boston on the evening of April 8th, 1911. The hearty welcome I received from one and all intimately concerned with the expedition, and from my numerous friends here, was ample reward for any personal difficulties and dangers I had encountered.

Just one word in conclusion. In China, the success of any venture depends very largely upon the sympathetic assistance and coöperation on the part of native help. My association and

dealings with the Chinese from first to last have been both pleasant and cordial. I have great pleasure in placing upon record my deep appreciation of the honest and faithful work rendered by my Chinese employes to the service of plant exploration in Western China.

COLOR IN THE FLOWER GARDEN.

By Mrs. Francis King, Alma, Michigan.

Delivered before the Society, March 30, 1912.

I stand here in some trepidation. When Mrs. Wharton, writing "The Fruit of the Tree" wished to send a suffering heroine to a bourne whence few if any travelers return, she relegated her to Michigan, a sentence, as one reads it, of exile, almost of death. And in the light of such Eastern opinion of my adopted state and considering your most flattering suggestion that I, a dweller in Michigan, should dare to discuss in Boston, the question of one aspect of flower gardening, I am compelled to timidly ask myself, apologizing at the same time for my temerity, Can any good thing come out of Michigan?

With this genuinely deprecatory start, I will address myself to the matter in hand and say that I rejoice to lift what voice I have in defence of a subject not as yet commonly debated in this country; hardly indeed considered here at all till within the last ten years, yet of very vital importance to the bright and alluring art of fine flower gardening — color arrangement in the flower garden.

The very broadest consideration of color in gardening would turn our minds to the general color effect of a garden in relation to its large setting of country. Was it not Ruskin who in spite of his rages at the average mid-Victorian garden said that gardens as well as houses should in general color harmonize with the surrounding country; certain tones for the simple blue country of England; others for the colder grey country of Italy. Never was sounder color advice given than that contained in the following lines from one of the Oxford lectures — "Bluish purple is the only flower color which nature ever used in masses of distant effect; this, however, she does in the case of most heathers with the

Rhododendron ferrugineum, and less extensively with the colder color of the wood hyacinth; accordingly the large rhododendron may be used to almost any extent in masses; the pale varieties of the rose more sparingly and on the turf, the wild violet and the pansy should be sown by chance, so that they may grow in undulations of color and should be relieved by a few primroses."

There never was so rich a time as the present for the great quantity of material available for use in the study of garden color. The range of tones in flowers today is almost measureless; never before were seen pinks of such richness, such deep velvet-like violets, delicate buffs and salmons, actual blues, vivid orange tones, pale, beautiful lavenders. Through the magic of the hybridizers we are today without excuse for ugliness in the garden. The horticultural palette is furnished forth indeed. Take perennial phloxes alone, for rich violet purple we have Lord Rayleigh, for the redder purple, Von Hochberg, for the lavenders which should be used with these, Eugene Danzanvilliers and Antonin Mercie; for whites, the wondrous Von Lassberg and the low but effective Tapis Blanc; while in the list of vivid or delicate pinks not one of which is unworthy of a place in the finest garden stand, G. A. Strohlein, Gruppen, Konigen, General Von Heutz Selma, Bridesmaid, General Chanzy, Jules Cambon, and Elizabeth Campbell, already an established favorite in England and now offered in America. Ellen Willmott too, a pale grey phlox, should be immensely useful.

Speaking parenthetically I have to confess to a faint prejudice against stripes, flakes, or eyes in the phloxes, principally because as a rule the best effects in color groupings are obtained by the use of flowers of clear solid tones, otherwise one cannot count upon the result of one's planning.

With the eye an unexpected element enters into our composition. Among irises what a possible range of color pictures in lavenders, blues, bronzes, yellows, spring up to the mind's eye with the very mention of the flowers' musical name. The immense choice of species and varieties, the difference in form and height, and more notably the unending number of their lovely hues make the iris family a true treasure house for the good flower gardener. The first comer at our spring iris festival is the shy stiff

Iris reticulata of four inches; the last of the lovely guests is the great white English iris of four feet; and those who have shown themselves between the opening and closing days of iris time are of many nations, German, Japanese, Siberian, English, and Dutch.

Tulips, so highly developed in our day, present a wonderful field of color from which to choose; so does the dahlia tribe. It is easy to see that the glaring faults in color planting in our gardens are not due to lack of good material.

The question of absolute color is a very nice question indeed, and reminds one of the old proverb of one man's meat being another man's poison. We cannot say that a given color is ugly. Its beauty or lack of beauty depends upon its relation to other colors. To say that one dislikes mauve is not to prove mauve unbeautiful. Most of us who have prejudices against a certain color would be amazed at the effect upon our color sense of the offensive hue when judiciously used with correlated tones. For instance, what commoner than to hear this exclamation as one wanders in an August garden where a clump of tall phloxes have reverted to the magenta, despised of most of us, and where the hostess's shears have been spared to the spoiling of the garden: "What a horrible color has that phlox taken on," but, take that same group of flowering stems another year, back it by the pale spires of *Physostegia virginica rosea*, see that phlox Lord Rayleigh blooms beside it, a good lavender like Antonin Mercie is hard by, let some masses of rich purple petunia have their will below, with perhaps the flat panicles of large-flowered white verbena, a few spikes of gladiolus Baron Hulot, and some trusses of a pinkish lavender heliotrope judiciously disposed, and lo! the ugliness of the magenta phlox has been transmuted into a positive beauty. It has become an active agent toward the loveliness of the whole picture.

What a lucky thing for us delvers into plant and seed lists if the color tests of railways, on a more elaborate and delicate scale, to be sure, could be applied to the eyes of the writers of color descriptions for these publications. The only available guide to the absolute color of flowers of which I happen to know is the "Repertoire des Couleurs", published by the Chrysanthemum Society of France. Of this there is soon to be published a pocket

edition; and the American Gladiolus Society has a somewhat similar project under consideration. Here we have in the French publication a criterion, a standard; and if this were oftener consulted, the gardening world of this country would be working on a much higher plane than is the case today.

So much for the range of color in our flower gardens, for the relative and absolute values of flower colors; but what of the abuse of these things? May I give an instance? Not long since there came to my eye that which it is always my delight to see, the landscape architect's plan of an uncommonly fine formal garden. For the spring adornment of this garden, such hyacinths and tulips were specified as at once to cause in my mind at least, grave doubts concerning color harmonies and periods of bloom. Were certain ones early? Would certain ones be late? as to secure a brilliantly gay effect, some should surely flower together. For my own pleasure I worked out a substitute set of bulbs and sent it to one of the authorities on color in spring-growing things in this country, who thus wrote of the original plan. "In regard to the color combinations upon which you asked my comment, I can only say that they are a fair sample of how little most folks know about bulbs. In the bed of hyacinths King of the Blues will prove quite too dark for the other colors; Perle Brillante or Electra would have been much better. In the two tulip combinations I can see no harmony at all. Keizerkroon, in my opinion, should never be planted with any other tulips. Its gaudiness is too harsh unless it is seen by itself. Furthermore, both Rose Luisante and White Swan will bloom just enough later not to be right when the others are in their prime."

Now what is the good of our finest gardens if they are to be thus misused and the owner's taste misdirected in this fashion. We spend our money for that which is not bread. I have a new profession to propose, it shall be called that of the garden colorist. The calling shall be distinct from that of the landscape architect, distinct indeed from those whose office it already is to prescribe the plants for the garden. The garden colorist shall be qualified to beautifully plant according to color the best planned gardens of our best designers. It shall be his duty first to possess a true color instinct; second to have had much experience in the growing

of flowers, notably in the growing of novelties in form and color; third, to so make his planting plans that there shall be successive pictures of loveliness melting into each other with successive months; and last he must pay, if possible, a weekly visit to his gardens, for no eye but his discerning one will see in them the evil and the good. This profession will doubtless have its first recruits from the ranks of women; at least, according to Mr. W. C. Egan, the color sense is far oftener the attribute of women than of men. Still there is the art of painting to refute this argument.

Color, as an aid to garden design is a matter ever present to my mind where a plan of high beauty has been adopted and been already carried out. One occasionally sees a fine garden which due to the execrable color arrangement must of necessity be more interesting in winter than in summer. Sir Wm. Eden's plea for the flowerless garden here comes to mind.

"I have come to the conclusion that it is flowers that ruin a garden, at any rate many gardens. Flowers in a cottage garden, yes, hollyhocks against a grey wall; orange lilies against a white one; white lilies against a mass of green; aubretia and arabis and thrift to edge your walks. Delphiniums against a yew hedge, and lavender anywhere. But the delight in color, as people say, in large gardens is the offensive thing; flowers combined with shrubs and trees, the garden of the Riviera for instance, Cannes, and the much praised vulgar Monte Carlo. Beds of begonias, cinerarias at the foot of a palm; the terrible crimson rambler trailing around its trunk. I have never seen a garden of taste in France. Go to Italy, go to Tivoli and then you will see what I mean by the beauty of a garden without flowers, yews, cypress, statues, steps, fountains, sombre, dignified, restful."

But when planting *is* right, when great groups, say of white hydrangea; when tall rows of hollyhocks of harmonious color; when delicate garlands of such a marvelous rambler as Tausendschön; low flat plantings of some fine verbena, like Beauty of Oxford or the purple Dolores; when such fine materials are used to produce an effect of balanced beauty, to heighten the loveliness of proportion and of line already lying before one in stone or brick, in turf or gravel, on good trellis, or in well groomed hedge, what an eminence of beauty may be reached.

The form and color of flowers in my opinion, should be considered as seriously for the formal garden as the soil about their roots. Effects with tall flowers, lilacs and delphiniums; with dwarf flowers, hardy candytuft, for instance; with lace-like flowers the heucheras, the gypsophilas; with round-trussed flowers, phloxes; with massive-leaved flowers, the funkias or *Crambe cordifolia;* with slender flowers, gladiolus, salpiglossis; with low-spreading flowers, statice, annual phloxes; with delicately branching flowers, the annual larkspur; what an endless array in the matter of form and habit! The trouble with most of us is that we try to get in all the flowers, and also we often go so far as to insist on using all the colors too, with a result usually terrific.

On the other hand, according to a capital English writer, " the present taste is a little too timid about mixtures and contrasts of color. Few of those who advise upon the color arrangements of flowers, seem to be aware that nearly all colors go well together in a garden, if only they are thoroughly mixed up. It is the half-hearted contrasts where only two or three colors are employed, and those the wrong ones, that are really ugly. The Orientals know more about color than we do, and in their coloring, they imitate the audacity and profusion of nature."

Those who lead us in these matters will I am sure gradually and gently conduct us to an austerer taste, a wish for more simplicity of effect in our gardens; the sure path, if the narrow one, to beauty in gardening.

The stream of my horticultural thought runs here a trifle broader, and I see the charm of gardens of one color alone; these of course with the varying tones of such a color and with the liberal or sparing use of white flowers. It is I think a daughter of Du Maurier whose English garden is one lovely riot the summer through of mauve, purple, cool pink, and white. I can fancy nothing more lovely if it receive the artist's touch. A garden of rich purples, brilliant blues and their paler shades, with cream and white, could be a masterpiece in the right hand.

Such was last summer the garden at Ashridge, Lord Brownlow's fine place in England, the following brief description of which was sent me by the hand that planted it. " Purple and blue beds at Ashridge (very difficult to get enough blue when tall

blue delphiniums are over). Blue delphiniums, blue salvia, (August and September) purple clematis, single petunia, violas, purple sweet peas, salpiglossis, stocks, blue nemesia, blue branching annual delphiniums, purple perennial phloxes, purple gladiolus. What more lovely than a small garden of all the range of yellows and of orange tempered by cream-white blooms. All these I repeat should be small, averting the possibility of monotony.

May I come now from generalization to detail, and will you permit me to relate a few of my own gardening attempts? And first, a word of explanation. It will doubtless have occurred to you already that I am, as one might say, a self-made gardener. I have seen few of the great gardens of this country; a few more perhaps of those of England and France; my gardening sense has been fostered only by life in a suburb or in a small town, stimulated mainly by reading and experiment. "Thank Goodness" exclaims one lively writer, "that gardening is not an exact science." "Thank Goodness," say I with all fervor or I should never have persisted in it. Some of my tryings-out have given me such sensations of pleasure that with your permission, I will mention one of my own color-groupings of flowers for each month of a season beginning with April, ending with October.

An April blossoming which for several years has been the source of much pleasure to my eye is a composition of blue and purple thus obtained. Sheets of *Scilla sibirica* planted near and really running into thick colonies of *Crocus purpureus grandiflora;* rich true blue against rich true purple provides a sight in flower carpeting not so often seen in gardens, yet doubtless blooming, budding, and fading unseen on many an Alpine slope. Add to these strong colors, as for April variety I have once done, touches of the intense violet of *Iris reticulata* and the delicate pink of hepatica, and the April bouquet is interesting indeed.

In May, what color combinations with the lilac and the tulip! The marvels which the great and lamented Victor Lemoine has given us in the world of lilacs provide a delicately sumptuous background for all those May-flowering tulips which contain no hint of scarlet or of orange. I think I may safely say that any Darwin or Cottage tulip with those exceptions would be excellent if associated with such lilacs as Mme. Abel Chatenay, Charles X, Presi-

dent Grevy, Emile Lemoine, and Azurea. Two varieties of Darwins, Clara Butt, a fine lavender pink, and the Reverend H. Ewbank, a capital greyish lavender, are exceptionally good in masses below lilacs, though Phillis, a charming pale lilac Darwin, would also be welcome here, and nothing could serve better as a substitute for Clara Butt than *Gesneriana lutea*, if a lemon yellow and lavender effect were preferred to the pink and lavender. With the latter, I have always liked to see *Dicentra spectabilis*, its loose arches of bloom tone in so remarkably with Clara Butt, the pink Darwin. A lovely thing too, before these tulips as they bloom is the taller blue myosotis in one or two places. The contrast of form and of color too, is equally delightful.

May I mention also a nice planting which gives not only a succession of spring bloom but a pretty color combination, and this on a clay bank, where the spoiled darlings of the formal garden might pine and die. *Rosa Wichuraiana*, one parent of all the rambler tribe, covers this spot. In May, when leaf buds are showing along its thorny stems, up comes in irregular colonies, the beautiful tulip Couleur Cardinal; nearby the heavy pale lavender heads of hyacinth Holbein afford a perfect companion tone for the outer color of the petals of Couleur Cardinal, which bear a rich plum-like bloom as impossible to describe as the hue of the perfectly ripened peach. Beyond these tulips stand groups of the fine double narcissus Orange Phoenix, its effect more cream-white than orange, completing a richly soft, spring picture.

I can hardly leave the May beauty of the border without mentioning the sheets of Munstead primrose, which make the month so longed-for and so lovely, with drifts of tulip White Swan among them. A stream or two of tulip Chrysolora, with masses of narcissus Barri Flora Wilson beyond, tall lemon colored fritillaries near the narcissus, and glimpses of *Arabis alpina* still farther away. All this on the south slope of a small mound planted to white pine; silvery leaf buds of Carolina poplar hanging above it. I speak in large terms with such words as masses and drifts; perhaps I should say here that all these are in reality miniature plantings; that we are land owners only to the extent of two acres and a quarter; that all bulbs are in or near shrub borders; and that perennial and annual flowers are kept with one or two excep-

tions for the small formal garden, and for that vital spot, the trial garden.

The reference to the trial garden moves me to offer here the names of half a dozen annuals and as many perennials with which I have made acquaintance through the trial garden, and which have thrown an added glamour for me over the whole matter of color in the garden. Sutton's double salmon clarkia; Sutton's Rose stock-flowered larkspur (happily well known now); Sutton's snapdragons Coral Red and Bright Pink; the pink mallow, *Lavatera rosea splendens*, old but very valuable; scabiosa Sutton's Black Prince; and the two pink verbenas, Beauty of Oxford and Ellen Willmott; the latter a delicious arbutus pink and white. For perennials, delphinium Cantab, a remarkable blue; the two heucheras, Flambeau and Pluie de Feu; *Eryngium amethystinum;* the glorious Oriental poppies Mrs. Perry and Princess Victoria Louise; *Artemisia lactiflora*, of which mention is made later; and *Clematis recta*, too little used for so fine an addition to our beds or borders.

A handful of the newer varieties of hardy phlox as they looked to me in my trial garden two years ago, I may mention now; R. P. Struthers, superb salmon-red, strikingly rich in color; G. A. Strohlein, orange-scarlet with a blood red eye; General von Heutz, brilliant salmon-red, white eye of medium height; Gruppen Konigen, flesh color, with a dark eye, immense masses of bloom; Snow Queen, with a large branching truss; Mme. Meuret, fine clear pink, truss large, composed of small florets. Any or all of these I commend as unusually beautiful phloxes for color.

Most of these are so called novelties; and here may I speak one word for novelties? In the older days, they were to be found on pink pages on our seed list. The pink pages are practically extinct, which I regret, for their very color stimulated imagination. The progressive seed and plant houses of today however, offer, if on white pages, lists of novelties in plants and shrubs which are surely not only finer in type than ever before, but more thoroughly tested, better established in the eyes of the introducers, and therefore better worth a trying-out on our part. It is difficult now to realize that Thunberg's barberry is a comparatively recent novelty. Today many things as valuable as this

are offered us for trial. I am a thorough believer in novelties; try a few new things each year is my earnest advice to those who would consider the best advancement of their gardens.

To return, after this too practical divergence, to the plantings for color by months. June has to show a grouping of a beauty altogether its own. Anchusa, the Dropmore variety of course, with delphinium Cantab, backs the planting; White Canterbury bells are near; the perennial campanula, a so-called blue, but really a bluish-purple, comes into the group; the middle distance, as it were, is filled by one of the clear deep rose pyrethrums; while their stems are in turn hidden by low masses of one of the grass pinks covered with flowers which look confidingly upward toward its loftier neighbors.

A July planting in the border has seemed to give some special pleasure. The simplest thing imaginable; common elder, perhaps a dozen or so; possibly a hundred spikes of *Lilium elegans*; below these again, gaillardia in the clearest tones obtainable, no belts of color on the ray petals.

Now comes August with its glorious phloxes from which to choose. Pantheon, I think most lovely near *Eryngium amethystinum*; Lord Rayleigh with heliotrope or ageratum Stella Gurnee below, a lavender and rich purple scheme. To suggest: phlox Lord Rayleigh with the fine lavenders near, Eugene Danzanvilliers and Antonin Mercie; below these either a very deep purple petunia, or verbena Dolores. The new pink phlox E. Campbell will certainly prove a great acquisition for an August color scheme. Mr. Wilbur Dubois of Madisonville, Ohio, one who knows, thus describes it: "A soft fresh bright pink, with red eye; in mass the eye is rather a negligible feature, not conveying a pronounced impression as if it were a distinctive trait of the flower." We hear little of that old variety of phlox Aurore Boreale, but its unusual height, its rich salmon tones, not in the least affected by the somewhat carmine eye of each floret, makes it one of the great August stand-bys. The great point about phloxes is their reliability. Who shall say that flowers have no personality when we consider the novel habit of this flower, the certainty of its bloom at a given date, its freedom from disease, and its marvelous qualities of resistance to frost and heat, drought and flood. My ad-

miration for the hardy phlox is kindled afresh with the usual spring appearance of such a list as that of the Scotchman, John Forbes, whose pages glow with no less than 350 varieties of this glorious flower. For a garden of phloxes I have pled before this day, a garden begun with the low growing varieties or creeping phloxes; continued by the native *Phlox divaricata,* and its newer variety Laphami, carried through a June fortnight by some annual of harmonious or delicate tone till Miss Lingard arrives; the lady ushers in the whole superb company of early, medium, and late phloxes.

I have always wished to see Miss Kneeland's celebrated phlox garden at Lenox, where I understand the August phloxes are grown lavishly but in mixture; a plan which greatly stimulates my curiosity.

It is impossible for me to leave this topic without an added reference to verbena Beauty of Oxford; no new variety by any means, but so lovely in masses below or near phlox Pantheon that it must have a word; indeed its place cannot be taken by another annual or perennial that I know. Its color is so excellent, a warm pink, its bloom so extravagant, its branches so obedient to the verbena pin, or so upright when left unconfined.

September brings a cloud of lovely lavender bloom with its closing days, and nothing can I recommend more heartily than gladiolus America grown in loose groups of from twelve to twenty-five below the delicate gauze bloom of such hardy asters as Pulcherrima and Coombe Fishacre, with Madonna, a fine pinkish lavender, back of these lower ones; and Lady Augusta Trevelyan, one of the very earliest, a charming white-flowered variety four feet tall, somewhere beyond. There is an echo of the flowers of May in this September bloom; the lilacs and pink tulips repeated here in fainter tones of lavender daisy, and paler pink of gladiolus, fainter and paler as befits the dying summer.

A very beautiful lavender-blue hardy aster is James Ganly; indeed to me the very loveliest of them all; about three feet in height, but of a remarkably good color, much bluer than most of the tribe. Do, if you can, plant these charming things against a tall clipped hedge or against dark leaved trees or shrubs; their beauties will be enhanced a thousand fold. There is a range of

them to choose from nearly equal in length to the phlox list; and what with Salvia Azurea, with its almost sky-blue flowers, with *Artemisia lactiflora*, that lovely spirea-looking thing which blooms with me in late September, with gladiolus such as America, Sulphur King, Peace, Baron Hulot (small but of the richest violet known to growers); no end of bewitching color combinations may be had in September of flowers which no drought can corrupt, no worm or grub break through and steal.

As I write a bit of winter landscape lies before me; but I have been thinking of flowers, of summer; I do not feel the cold, I hardly see the snow; I see as in a dream what I saw last summer, the great prairies stretching for some miles back of the beautiful city of Tacoma. At the far extremity of one of these prairies, where groups of firs are seen in noble arrangement or so superbly set as to present an appearance of the utmost achievement of landscape art; at the far edge we drive among a grove of the beautiful dark trees and come suddenly upon a rustic gateway dripping with pale pink rambler roses.

We pass inside the gate between short bordering beds of hybrid perpetual roses, turn sharply to the right and behold one of the most lovely flowering vistas it has ever been my good luck to see real and living. It seems painted; it is too good to be true, this artist's arrangement of colors within a long pergola built of saplings with the bark still upon them. "I made it all myself," delightedly exclaims our hostess as our unconcealed surprise and pleasure in this lovely garden effect flows forth in excited talk. On the right entering the pergola — a pergola with a *raison d'etre* for it conducts from gate to house — grey foliage of pinks, Canterbury bells back of those; further down masses of Shasta daisies, gigantic here in stature; beyond those clouds of the grey gypsophila and then a delicious mass of color in tones ranging from pale lavender to deepest purple, the flowers most excellently massed, an effect of carelessness which is supremest art. Among the flowers used, the hyacinth-flowered candytuft, which Burpee sends out, here appearing in pinkish mauve, deep purplish pink and white; purple pansies snuggling among these; rich purple annual larkspur, sending up a few spires here and there; and climbing above all a lavender and mauve sweet pea; faint notes of the color below

reflected in the air. How could the garden at Biskra have seemed a more alluring retreat to the weary traveler from the desert than this bejewelled way, cool, fresh, safely brilliant, after the dusty prairie, its barrier toward the city.

It is garden planting such as this which gives joy to the discriminating; it is beyond all a question of the mind and eye. The nobler the intellect, the more poetic the imaginative vision, the happier he or she who gardens; and is there anyone so happy as the fortunate possessor of a bit of ground, and the wish to give a loveliness higher than earth has yet been known to show? What reason for deep thanksgiving there and then. He who has done this should be a supremely happy man, and in the fine sentence of a recent writer, "to the supremely happy man, all times are times of thanksgiving, deep tranquil and abundant, for the delight, the majesty, and the beauty of the fulness of the rolling world."

MAY 5 1913
Agricultural
College

TRANSACTIONS

OF THE

MASSACHUSETTS HORTICULTURAL SOCIETY

FOR THE YEAR 1912

PART II

PUBLISHED BY THE SOCIETY
BOSTON
NINETEEN HUNDRED AND THIRTEEN

TRANSACTIONS

OF THE

Massachusetts Horticultural Society

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PRINTED FOR THE SOCIETY
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Massachusetts Horticultural Society

1912

The Transactions of the Society are issued annually in two parts under the direction of the Committee on Lectures and Publications.

Communications relating to the objects of the Society, its publications, exhibitions, and membership, may be addressed to William P. Rich, Secretary, Horticultural Hall, No. 300 Massachusetts Avenue, Boston, Massachusetts.

Edward B. Wilder, *Chairman*	*Committee on Lectures and Publications*
Robert Cameron	
John K. M. L. Farquhar	

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ANNUAL REPORTS FOR THE YEAR 1912.

The Italian Garden, March, 1912

TRANSACTIONS

OF THE

Massachusetts Horticultural Society.

1912, PART II.

REPORT OF THE BOARD OF TRUSTEES FOR THE YEAR 1912.

The Board of Trustees of the Massachusetts Horticultural Society presents herewith a summary of the business transacted at its meetings during the year 1912. Five meetings have been held with an average attendance of nine members.

January 6. Letters from M. Emile Lemoine were read expressing on behalf of his father, M. Victor Lemoine, his most hearty feelings of gratitude for the honor bestowed upon him by the Society in the award of the George Robert White Medal of Honor for the year 1911, and under a later date announcing the death of his father on December 12.

It was voted that the President be requested to appoint as an accredited representative of the Society any member visiting London on the occasion of the Royal International Horticultural Exhibition in May, 1912. It was voted also to offer at this exhibition the Society's Gold Medal for the best display of varieties of roses in bloom originating in the United States.

An addition of $700.00 to the annual appropriation for prizes and gratuities was made at this meeting.

January 13. Mr. Saltonstall, chairman of the special committee appointed to consider the matter of the proper treatment of the special trust funds of the Society, submitted the following report:

January 6, 1912.

To the Trustees of the
Massachusetts Horticultural Society.

Gentlemen: —

The Special Committee of the Trustees appointed to consider and report upon the matter of the application of the income derived from the special funds donated to the Society beg to report that in their opinion it would be advisable to print as part of the Treasurer's Report for each year, a brief enumeration of these various funds, mentioning the same by name, amount, together with a brief statement of the purposes which the donor provided for as to the application of the income derived from such funds; that the Committee on Prizes should each year have this list before them, and should apply the income from the various funds in the awarding of the prizes in each case to accord as closely as possible with the purposes named by the donors of the funds. If the prizes awarded throughout the year are numbered consecutively, a short statement could easily be made under each fund, showing how the income has been applied in the awarding of the prizes; substantially as shown on the sheet accompanying this Report; in those cases where it is impracticable to undertake to follow out with any degree of closeness the purposes mentioned by the donors, the Trustees should be called upon to consider in each case how the income shall then be applied, and in cases where it may appear impracticable to apply the income to accord with the purposes of the donor, it may be advisable to apply to the Court for instructions.

Where for any reason the full amount of the income is not applied and used in any year, the same should be carried over to be specially applied and used in succeeding years as income unless the terms of the gift or the Trustees specifically direct that such surplus be added to the principal of the fund.

We find that the invested personal property of the Society is now yielding a trifle over 4% as a whole, and we recommend, subject to revision in the future, that the special funds be deemed to yield a uniform return of 4% and the income therefrom be applied accordingly.

Respectfully submitted,

(Signed) Richard M. Saltonstall
Walter Hunnewell
William P. Rich
} Committee.

It was voted that the report of the committee on the special trust funds of the Society be accepted, the recommendations adopted, and the committee discharged.

Mr. Walter Hunnewell was appointed Treasurer of the Society for the current year and Mr. William P. Rich was appointed Secretary, Librarian, and Superintendent of the building.

Appropriations were voted as follow:

For the library, $400.00 in addition to the income of the French and Farlow Funds.

For lectures, a sum not exceeding $500.00, to include the income of the John Lewis Russell Fund.

For the preparation of the library catalogue, $500.00.

For superintendence of exhibitions, $250.00.

It was voted that the Society's Gold Medal be awarded to Mr. E. H. Wilson in further recognition of his work in western China, as illustrated in a series of remarkable photographs of Chinese plants and scenery, exhibited at Horticultural Hall, December 26 to 31, 1911.

A special committee, consisting of Messrs. Sargent, Farquhar, and Roland, was appointed to nominate a candidate for the award of the George Robert White Medal of Honor and to report at a future meeting.

The following named persons were duly elected to membership in the Society:

Harry Payne Hodgkins, Jamaica Plain, proposed by W. N. Craig.

Arthur E. Horton, Lexington, proposed by W. P. Rich.

Roy W. Hutchinson, Melrose, proposed by W. P. Rich.

Thomas F. Galvin, Brookline, proposed by J. K. M. L. Farquhar.

Thomas F. Galvin, Jr., Wayland, proposed by J. K. M. L. Farquhar.

Arthur E. Thatcher, Jamaica Plain, proposed by J. K. M. L. Farquhar.

H. H. Richardson, Brookline, proposed by C. S. Sargent.

John L. Saltonstall, Beverly, proposed by C. S. Sargent.

Mrs. John L. Saltonstall, Beverly, proposed by C. S. Sargent.

Miss Mabel Keyes Babcock, Wellesley, proposed by J. G. Jack.

F. W. Hunnewell, 2d, Wellesley, proposed by W. Hunnewell.

H. Dickerson Eaton, Southboro, proposed by C. S. Sargent.
Alexander McKay, Jamaica Plain, proposed by W. N. Craig.

April 6. A letter from Mr. George Robert White was read in regard to a further gift to the Society of one thousand dollars to be added to the George Robert White Medal of Honor Fund. This additional sum is for the purpose of enabling the Society to have a special die engraved for the name of the recipient of the medal each year.

It was voted to accept with thanks the gift of Mr. White.

A communication from the Secretary of the State Board of Agriculture was read notifying the Society of an increase of $400.00 in the State's appropriation for the encouragement of agriculture by the granting of bounties to agricultural societies. Of this amount $200.00 is to be distributed in premiums to children.

It was voted to refer the matter to the Committee on Prizes and Exhibitions with power to amend the Schedule of Prizes in accordance with the requirements of the Act of the Legislature.

A communication from the Committee on Plants and Flowers was received recommending the award of a Special Diploma to Mr. James F. M. Farquhar for horticultural skill in the development of an Italian Garden recently illustrated by the notable exhibition at Horticultural Hall.

It was voted that the Society's diploma be awarded Mr. Farquhar in accordance with the recommendation of the Committee on Plants and Flowers.

It was voted also to invite the American Association of Park Superintendents to hold its fourteenth annual convention at Horticultural Hall on August 12, 13, and 14, 1912.

On motion of Mr. Farquhar it was voted to recommend to the Society the election of Mr. C. Harman Payne of London to corresponding membership.

The following named persons were elected to membership in the Society:

Dr. Francis I. Proctor, Boston, proposed by C. W. Parker.
Henry H. Proctor, Boston, proposed by C. W. Parker.
Fred A. Smith, Ipswich, proposed by C. W. Parker.

Mrs. Evelyn L. Wellington, Boston, proposed by C. W. Parker.
John O'Conner, Brookline, proposed by C. W. Parker.
Mrs. George G. Hall, Boston, proposed by C. W. Parker.
Mrs. Sumner Hollingsworth, Boston, proposed by C. W. Parker.
H. B. Reed, South Weymouth, proposed by C. W. Parker.
Walter D. Brooks, Milton, proposed by N. T. Kidder.
Mrs. Mary P. Wardwell, Haverhill, proposed by G. C. Thurlow.
Mrs. Herbert L. Clarke, Reading, proposed by Mrs. J. R. French.
George E. Morris, Waltham, proposed by W. P. Rich.
Chester I. Campbell, Wollaston, proposed by N. F. Comley.
Charles H. Swan, Jamaica Plain, proposed by B. M. Watson.
James S. Bache, Wellesley Farms, proposed by J. K. M. L. Farquhar.

October 5. An informal communication from Professor F. A. Waugh of the Massachusetts Agricultural College was considered in relation to coöperation with the Society in some form of horticultural educational work in the way of demonstration lectures and courses of study.

It was voted that a committee of three be appointed, of which Mr. Hunnewell should be chairman, to confer with the College in this matter. The Chair appointed Messrs. Hunnewell, Farquhar, and Wheeler as this committee.

It was voted also to grant the use of the Lecture Hall of the Society's building to the Massachusetts Fruit Growers' Association on the occasion of its annual convention, January 10 and 11, 1913.

Mr. Kidder, for the committee on amendments to the By-laws of the Society, reported numerous proposed changes which were considered in detail, and it was voted that the amendments as proposed by the committee and as amended by the Trustees be embodied in a formal way to be acted upon by the members of the Society at the next annual meeting.

The sum of $6000.00 in addition to the income of the various special prize funds of the Society was voted for prizes and gratuities for the year 1913.

It was voted to extend an invitation to the Sweet Pea Society of America to hold its next annual meeting and exhibition in the halls of the Society's building.

Mr. Farquhar referred to the need of a new diploma of membership and it was voted to appoint him and the Secretary a committee to report on the subject at the next meeting.

It was further voted to offer one Society's Gold Medal and three Silver Medals at the exhibition of the Society of American Florists to be held in New York in April, 1913.

The following named persons were elected to membership in the Society:

John H. Hardy, Jr., Littleton, proposed by Wilfrid Wheeler.

Nicholas F. McCarthy, Boston, proposed by J. K. M. L. Farquhar.

William Percival Edgar, Jamaica Plain, proposed by J. K. M. L. Farquhar.

Miss Julia H. Bradley, Roxbury, proposed by J. K. M. L. Farquhar.

Charles H. Bradley, Boston, proposed by C. W. Parker.

Mrs. Henry S. Hunnewell, Boston, proposed by C. S. Sargent.

Mrs. Daniel Goodwin, East Greenwich, R. I., proposed by C. S. Sargent.

Mrs. David S. Greenough, Jamaica Plain, proposed by C. H. Swan.

Edwin Jenkins, Lenox, proposed by James Wheeler.

Frederic Heeremans, Lenox, proposed by James Wheeler.

L. Merton Gage, Groton, proposed by W. P. Rich.

John Kirkegaard, Bedford, proposed by A. F. Barney.

William Reiff, Boston, proposed by A. E. Horton.

Monroe Ames, Lexington, proposed by A. E. Horton.

December 7. Mr. Farquhar, for the special committee on procuring a new plate for the membership diploma of the Society, reported that the former copper plate, used for many years, could not be found and that it was probably destroyed in the great fire of 1872.

He stated that recent copies of the diploma had been reproduced by the heliotype process, but additional copies, which will have to be supplied in the course of a year or two, could not be satisfactorily reprinted by this process.

He reported that a new copper plate could be obtained at a cost of $300.00. He also advised the printing by lithograph process of a new Certificate of Honorable Mention. It was voted to authorize this committee to procure a new diploma plate at a cost of $300.00 and to have printed a number of copies of Certificates of Honorable Mention.

The special committee on nominations of standing committees for the ensuing year reported through its chairman, Mr. Kidder, the following list:

REPORT OF COMMITTEE ON NOMINATIONS.

COMMITTEES FOR 1913.

Finance:— Walter Hunnewell, Chairman, Arthur F. Estabrook, Stephen M. Weld.

Membership:— J. K. M. L. Farquhar, Walter Hunnewell, Richard M. Saltonstall.

Prizes and Exhibitions:— James Wheeler, Chairman, Robert Cameron, Duncan Finlayson, S. J. Goddard, T. D. Hatfield, Dr. Walter G. Kendall, Edward B. Wilder.

Plants and Flowers:— T. D. Hatfield, Chairman, Arthur H. Fewkes, Donald McKenzie, James Marlborough, William Nicholson, William Sim.

Fruits:— Edward B. Wilder, Chairman, William Downs, Harold L. Frost.

Vegetables:— Duncan Finlayson, Chairman, William N. Craig, Henry M. Howard.

Gardens and Greenhouses:— John K. M. L. Farquhar, Chairman, David R. Craig, Jackson T. Dawson, Arthur H. Fewkes, Thomas J. Grey, T. D. Hatfield, Richard Hittinger, Dr. Harris Kennedy, William Nicholson, David F. Roy, Charles Sander, Wilfrid Wheeler.

Library:— Charles S. Sargent, Chairman, Ernest B. Dane, Charles S. Minot.

Lectures and Publications:— Francis H. Appleton, Chairman, Robert Cameron, George B. Dorr.

Children's Gardens:— Henry S. Adams, Chairman, Miss Margaret A. Rand, Harry S. Rand, Wm. P. Rich, B. Hammond Tracy, James Wheeler.

The list of nominations as presented by the committee was unanimously accepted and the committee discharged.

It was voted to invite Mr. George B. Dorr to place on exhibition at Horticultural Hall his collection of plant photographs; this exhibition to be held at such time as may be mutually agreed upon.

The following appropriations for the year 1913 were voted:

For the library, $400.00, in addition to the income of the French and Farlow Funds.

For the purchase of books on landscape gardening, $200.00.

For lectures, $460.00 in addition to the income of the John Lewis Russell Fund.

For the employment of a publicity agent during the year, $500.00.

For an assistant in the preparation of the library catalogue, a sum not exceeding $500.00.

For superintendence of exhibitions, $250.00, to be paid to the chairman of the Committee on Prizes and Exhibitions in consideration of his taking full charge of the installation and arrangement of all the exhibitions of the year 1913.

For the publication of a new edition of the Charter and By-laws of the Society with amendments to date, $100.00.

It was further voted to transfer from the income of the Theodore Lyman Fund, No. 2, the sum of $250.00 to be used for the purchase of books for the library.

Mr. Allen called attention to the unsatisfactory color of the brick walls of the large exhibition hall and stated that some change should be made that a more suitable background for the exhibition of flowers could be obtained.

It was voted to refer the matter to a special committee consisting of Mr. Allen and the Secretary, for further consideration and report.

It was voted also that the same committee be authorized to have painted the walls of the corridor on the library floor at a cost not exceeding $175.00.

The special committee on the nomination of a candidate for the award of the George Robert White Medal of Honor for the current year reported the name of Michael Henry Walsh of Woods Hole, Massachusetts. The report of the committee was accepted and it

was voted that the George Robert White Medal of Honor for the year 1912 be awarded to Mr. Walsh.

It was voted to invite the New England Fruit Show to join with this Society in an exhibition of fruits during the autumn of the ensuing year; the date and arrangement of details to be referred to the Committee on Prizes and Exhibitions.

On motion of Professor Sargent Professor Hugo de Vries of the University of Amsterdam was elected a corresponding member of the Society.

The following named persons were elected to membership in the Society:

Max Paul Haendler, South Natick, proposed by T. D. Hatfield.

Walter Hunnewell, Jr., Wellesley, proposed by W. Hunnewell.

Mrs. N. P. Cutler, Newton, proposed by Robert Cameron.

Edward S. Payson, Lexington, proposed by A. E. Horton.

Mrs. Clement S. Houghton, Chestnut Hill, proposed by C. S. Houghton.

C. Henry B. Brackett, Boston, proposed by C. H. Breck.

Mrs. A. W. Tedcastle, Milton, proposed by J. K. M. L. Farquhar.

Bayard Tuckerman, Ipswich, proposed by Wm. C. Endicott.

Miss Emma Frances Jones, South Boston, proposed by Wm. P. Rich.

William J. Graham, Allston, proposed by Thomas J. Grey.

William N. Hartshorn, Boston, proposed by C. W. Parker.

William P. Rich,
Secretary.

REPORT OF THE COMMITTEE ON PRIZES AND EXHIBITIONS FOR THE YEAR 1912.

By John K. M. L. Farquhar, Chairman.

The Committee on Prizes and Exhibitions began its work of the year 1912 under the Chairmanship of Mr. John Algood Pettigrew, who had served as Chairman during the previous year.

Mr. Robert Cameron of the Harvard Botanic Garden, Cambridge, was appointed by the Committee as Superintendent of Exhibitions.

A new feature of the year was the Mid-Winter Flower Show, February 2nd to 4th. The classes of the exhibition previously held in January were included in this show and in addition numerous classes for spring-flowering bulbous plants and hard-wooded greenhouse plants were scheduled. The Show was large and the exhibits were of exceptionally fine quality.

The Spring Exhibition, March 22, 23, and 24, was somewhat smaller than usual, owing to the large exhibition hall being entirely occupied at the time by an Italian Garden designed and built by Mr. James F. M. Farquhar of the firm of R. & J. Farquhar & Co., which was open to the public March 16 to 24 inclusive. An account of this garden is given in the report of the Committee on Plants and Flowers.

On the Second day of July, Mr. John A. Pettigrew, the Chairman of the Committee on Prizes and Exhibitions, passed away after a lingering illness and the Committee at a meeting held July 6 appointed John K. M. L. Farquhar to serve as Chairman for the remainder of the year.

On July 13 and 14 the Sweet Pea Society of America held its fourth Annual Convention in conjunction with our regular exhibition of Sweet Peas and Summer Flowers. Owing to exceedingly hot weather and drought the exhibition fell short of what had been anticipated and the National Sweet Pea Society planned to hold its Convention in Boston next season.

The September Show of Dahlias and Fruit was extensive and most interesting. Dahlias were shown in great number; all the classes having called forth keen competition and the blooms shown were of superior quality.

The Fruit and Vegetable Exhibition, October 4, 5 and 6, taxed the capacity of the three halls. Apples were the leading feature and made a most attractive display.

The Chrysanthemum Show, Nov. 7, 8, 9 and 10, was better than for several years. Large specimen plants were exhibited in several large groups. The specimens displayed most skilful culture in size, symmetry, and quality and finish of the blooms.

The exhibitions of the year 1912 were highly creditable to the Society for their horticultural and educational value and the receipts at the doors for the March and November Shows ($6,808 75) gave evidence of increasing public interest.

JOHN K. M. L. FARQUHAR
ROBERT CAMERON
WILLIAM DOWNS
M. A. PATTEN
WILFRID WHEELER

Committee on Prizes and Exhibitions.

THE ITALIAN GARDEN, MARCH, 1912

REPORT OF THE COMMITTEE ON PLANTS AND FLOWERS FOR THE YEAR 1912.

By T. D. Hatfield, Chairman.

The regular shows of the Massachusetts Horticultural Society for 1912 were generally below the average. Competition was poor so that a considerable amount of the appropriation for prizes was unexpended. This should not be taken as meaning that too much money was appropriated but rather that competition should be stimulated.

The special shows of the year — The Italian Garden and Sweet Pea Show — were most successful which would indicate that special features are necessary attractions.

The Midwinter Flower Show.

The Midwinter Flower Show, February 2–4, did not come up to expectations although a liberal schedule was provided. Owing partly to severe weather the classes were poorly filled and in many there were no entries. The prizes for Indian azaleas, although quite liberal, brought out few entries and it was really too early for acacias and other hardwooded plants. Good prizes were offered for Rambler roses in pots and for forced herbaceous plants, but no entries were made. Most of these classes would have been better deferred until the Spring Show. It seems, however, that cut roses should have been shown.

The carnation growers made a most creditable display and competition was fairly full for most of the classes.

The best white carnation was White Wonder; the best pink, Gloriosa; best dark pink, Loris; crimson, Harry Fenn; scarlet, Beacon; and yellow, Golden Ray.

There were excellent primulas: *Primula sinensis* from William

Whitman and Edward J. Mitton; *P. stellata* from W. Whitman; and *P. obconica* from W. Whitman and Edward A. Clark.

There were also cinerarias from Mrs. J. L. Gardner and various exhibitors showed Indian azaleas, cyclamens, freesias, Roman hyacinths, and polyanthus narcissus.

H. Huebner of Groton made a beautiful display of winter-flowering snapdragons for which he was awarded Honorable Mention; Mrs. Oliver Ames, some well-grown *Euphorbia fulgens;* A. H. McKay, gardener to E. A. Clark, was awarded a Cultural Certificate for some well-grown Begonia Gloire de Lorraine; Messrs. Knight and Struck of New York received Honorable Mention for a neat display of *Erica codonoides;* and Mrs. E. M. Gill had a seasonable display of cut flowers.

The Spring Exhibition.

The regular Spring Show, March 22–24, was up to the average. The main attraction, however, was the Messrs. Farquhar's Italian Garden which had been running one week before the Spring Show opened. It was continued a week longer and was maintained in good condition up to the close.

Some of the plants at the opening were in bud, developing during the show, and were at their best towards the end. To watch the development of these was one of the most interesting features of the exhibition. It was a pretty picture and showed the highest artistic skill in arrangement, in the blending of colors, and particularly in perspective.

A large painting of an Italian villa and garden at the end of the hall carried one for a long distance beyond. Still pools with appropriate plants suitably arranged gave a picturesque charm, reflecting the bordering plants and flowers. A very important feature was the surrounding balconies with the so-called hanging gardens which with winding paths lent added interest and beauty, enabling the visitor to obtain a good view of the flower beds, pools, and fountains in the center of the garden, and statuary appropriately placed gave reality to the scene.

The following is a list of the plants used in the construction of the Italian Garden:

Abies alba
" alcoqueana
" balsamea
" canadensis
" concolor
" " violacea
" Douglasii
" Engelmanni
" excelsa
" " aurea
" Fraseri
" Kosteriana glauca
" " " pendula
" nigra
" Nordmanniana
Abutilon, varieties
Acacia armata
" Baileyana
" lophantha superba
Adiantum cuneatum
Agapanthus umbellatus
Ampelopsis Henryana
Antirrhinum, varieties
Araucaria excelsa
Asparagus plumosus nanus
" Sprengeri
Aspidistra lurida
Aucuba japonica
Azalea amoena
" indica
" Kaempferi
" ledifolia
" mollis
Begonia Gloire de Lorraine
" Gloire de Sceaux
" Pink Beauty
Browallia speciosa major
Buxus sempervirens
Calla Pearl of Stuttgart
Cineraria, varieties
Clematis Armandi Farquhariana
" montana rubens
Convallaria majalis
Cupressus Washingtoniana
Cycas revoluta
Cyclamen, in variety
Cyperus papyrus
Cytisus Laburnum
Daphne Cneorum
Deutzia gracilis
" Lemoinei
Dielytra spectabilis
Dracaena indivisa
Euonymus radicans
" vegetus
Ficus elastica
" repens
Forsythia suspensa
Freesia refracta alba odorata
Fuchsia, varieties
Gardenia
Genista canariensis
Heath, varieties
Hippeastrum
Hyacinth, varieties
Iris, Spanish
Isolepis gracilis
Jasminum primulinum
Juniperus chinensis aurea
" " pendula
" hibernica
" japonica aurea
" procumbens
" Sabina
" suecica
" virginica
Kalmia latifolia
Kentia belmoreana

Kentia Forsteriana
Kerria japonica
Lauro-cerasus
Laurus nobilis
Lilac Charles X
" Marie Legraye
Lilium candidum
" longiflorum
" myriophyllum
Linaria hederaefolia
Magnolia conspicua
" Soulangeana
Marguerite Boule de neige
Marguerites, white and yellow
Musa Ensete
Narcissus, varieties
Nephrolepis exaltata
" Whitmani
Pandanus Veitchii
Pansies
Passiflora caerulea
Pennisetum Ruppellii
Pinus austriaca
" excelsa
" Mughus
" ponderosa
" Strobus
" sylvestris
Polianthes tuberosa Double Pearl
Primula japonica
" kewensis
" obconica
" Polyantha
" vulgaris
Prunus triloba
Pteris, varieties
Retinispora ericoides
" filifera
Retinispora filifera aurea
" obtusa magnifica
" pisifera
" " aurea
" plumosa
" " aurea
" squarrosa
Rhynchospermum
Richardia Elliottiana
Roses, climbing, in variety
" hybrid perpetual
Schizanthus wisetonensis
Sciadopitys verticillata
Spiraea Gladstone
" japonica
" palmata
" Queen Alexandra
" Thunbergii
" Vanhouttei
Taxus cuspidata
" hibernica
Thuja compacta
" Ellwangeriana
" George Peabody
" globosa
" occidentalis
" " lutea
" pyramidalis
" sibirica
" Vervaeneana
" Warcana
Tulips, varieties
Vinca minor
" Trailing Green
Wallflowers, single and double
Wistaria chinensis
" " alba
" multijuga

Mrs. J. L. Gardner (William Thatcher, gardener) put up the first prize group of bulbous and decorative plants. It was particularly rich in varieties.

A. W. Preston of Swampscott (J. L. Smith, gardener) also had an extensive display, and Mr. Lyman of Waltham made a pretty exhibit of camellias and Cherokee roses which attracted much attention.

Henry L. and Margaret A. Rand won the prizes offered to amateurs for forced bulbs in pots.

The Messrs. Farquhar's cyclamens were extra fine, both in varieties and specimen plants, and won a Silver Medal.

A. Leuthy made an interesting display of commercial plants, M. A. Patten showed his new variegated carnation, Mrs. C. W. Barron, and C. H. Totty of Madison, N. J., the new white-flowered carnation Wodenethe for which a First Class Certificate was awarded.

The Messrs. Farquhar exhibited their new *Clematis Armandi* var. *Farquhariana*. This is a large-flowered form of the type and promises to be a splendid decorative plant for sheltered positions in the garden and cool conservatory; a Silver Medal was awarded it.

Louis Dupuy of Whitestone, N. Y., was awarded a Silver Medal for a new French hydrangea, *H. hortensis* var. Mme. Mouilliere. The flowers were white and finely formed. In addition in his group were Gen. Vitraye, pink; Radiant, pink; and Mme. Rene Gaillard, white; all beautiful varieties of hydrangeas. Mr. Dupuy had also a neat display of heaths, including *Erica ventricosa*, *E. Cavendishii*, yellow, *E. candidissima*, and *E. perspicua erecta*.

Fine lily of the valley in pots came from J. T. Butterworth of South Framingham, also *Cattleya trianae* and Cypripedium Van Dyke (*C. villosum* × *C. Lecanum*). A splendid *Cattleya Schroderae* came from Mrs. C. G. Weld, and the Weld Garden sent some interesting hybrid Calanthes and handsome specimens of *Dendrobium Wardianum* and *D. nobile* var. *nobilius* for which the gardener, Duncan Finlayson, received a First Class Cultural Certificate.

James Marlborough, gardener to Thomas E. Proctor of Topsfield, received a First Class Cultural Certificate for some marvellously-grown spikes of Antirrhinum, more than six feet tall, and Francis Skinner of Dedham had a collection of bulbous plants and some pretty specimens of the rose Tausendschön.

Mrs. C. G. Weld of Brookline showed some specimens of the so-called blue rose Veilchenblau which served only to show what an utterly undecorative plant it is. Mrs. H. F. Durant of Wellesley showed a large panicle of the now rarely seen *Medinilla magnifica.*

A very neat table of Begonia Pres't. Carnot with large panicles of salmon-red flowers with other decorative plants was sent by William Walke of Salem.

Wheeler & Co. of Waban as usual set up a very tasty table of orchids including *Calanthe Regnieri, Dendrobium superbum* and *D. Phalaenopsis, Cypripedium Boxallii, Odontoglossum Rossii,* and *Phalaenopsis Schilleriana.*

Walter Hunnewell of Wellesley showed *Rhododendron sinense,* a species rediscovered by Wilson in western China. It is barely hardy in Massachusetts, though it stands out and may in time become so. It has large orange-yellow flowers and has been used in hybridizing to get the fine yellow Ghent varieties. It was awarded Honorable Mention.

The May Exhibition.

The exhibition held May 11 and 12 was a poor show, only one class being filled, that of herbaceous Calceolarias, for which first and second prizes were awarded.

Thomas T. Watt, gardener to Mrs. H. F. Durant, received a Silver Medal for a remarkable specimen of *Oncidium Marshallianum* with 125 flowers. The flowers were yellow with brown markings, larger than *O. varicosum Rogersii.*

Mrs. C. G. Weld had a collection of Himalayan rhododendrons including *R. Veitchii, R. fragrantissima,* R. Princess Alice, R. Duchess of Edinboro, and R. Mrs. Weld. They varied considerably in type of flower, but all were white or faintly tinted and fragrant.

Adiantum Farleyense came from Thomas E. Proctor; *Hydrangea Otaksa* and some neat specimens of *Schizanthus Wisetonensis* from Edward A. Clark; and a fine specimen orchid, Laelio-Cattleya hybrid (*L.-C. hycana* × *L.-C. canhamiana*) came from Mrs. C. G. Weld.

Peony and Rhododendron Show.

At the Rhododendron Show, June 8, Walter Hunnewell and Francis Skinner were the only exhibitors of rhododendrons and, considering the severity of the past winter, the display was good. Mr. Skinner had in his exhibit Charles Bazeley, Mrs. Milner, Lee's Purple, Lady Armstrong, Album elegans, Caractacus, Henrietta Sargent, Mrs. Ingersoll, Roseum elegans, Prof. C. S. Sargent, Mrs. C. S. Sargent, Charles Dickens, Everestianum, H. W. Sargent, Gloriosum, and Purpureum elegans.

The Messrs. Farquhar had a large collection of herbaceous flowers including Double Pyrethrums and German irises. A Bronze Medal was given them for Pyrethrums.

The T. C. Thurlow's Sons Co. exhibited German irises and early-flowering peonies, and a Bronze Medal was awarded J. T. Butterworth for a fine specimen of *Miltonia vexillaria*.

Rose, Peony, and Strawberry Show.

Miss Fay and M. H. Walsh were missed among the rose exhibitors but the rose display, however, was very good. Duncan Finlayson made a large and beautiful exhibit of exceptional quality. The competition for "General Display" was well contested and the winners were in the order named: Mrs. Frederick Ayer, W. J. Clemson, and Mrs. E. M. Gill. A. F. Estabrook (George Barker, gardener) showed some excellent Hybrid Tea roses including Killarney, Etoile de Lyon, Kaiserin A. Victoria, and Caroline Testout.

The winning white rose was Frau Karl Druschki; pink, Mrs. John Laing; and red, Ulrich Brunner. The best among six varieties were Gen. Jacqueminot, Capt. Hayward, Mrs. John Laing, Ulrich Brunner, Mavourneen, and Druschki. Among the best twelve were Clio, Druschki, Camille de Rohan, John Hopper, Ulrich Brunner, Paul Neyron, Magna Charta, Margaret Dickson, Gen. Jacqueminot, Gabrielle Luizet, and Mrs. John Laing.

There was a large display of peonies and the quality of the blooms was excellent. The schedule called for a collection of six varieties

of one color, one flower each, in five colors. Three were competed for as follows in white, pink, and red. The competition was instructive in showing that many named varieties are alike, and the list is given here for that purpose. White — Marie Lemoine, Mdlle. Calot, Festiva Maxima, Baroness Schroeder, Marie Jacquin, and Couronne d'Or. Red — Eugene Bigot, Sir Fred. Leighton, Plutarch, Marechal Vailliant, Felix Crousse, Louis Van Houtte, and Frances Ortegal. Pink — La Perle, Therese, Mdlle. Emile Galle, Triomph de l'Exposition Universelle, Dorchester, and Venus.

Some of the notable peonies in the Messrs. Farquhar's collection were Emile Hoste, white; Meissonieu, deep red; Marie, blush; Gen. Bedan, rose; Victor Lemoine, blush; Venus, light rose; and Agnes Mary Kelway, pink with Japanese center. Among E. J. Shaylor's were Tourngalle, blush (First Class Certificate); Soulange, white (First Class Certificate); Lewiston, lavender; Georgiana Shaylor, blush; Marguerite Gerard, light pink; Beauty's Mask, lavender, showing yellow stamens.

The Harvard Botanic Garden made an attractive display of water plants including *Nymphaea Marliacea alba, N. M. rosea, N. M. chromatella, N. M. candidissima, Nymphaea Lydekeri, var. Robinsoniana, N. L. fulgens, N. L. candidissima, Salvinia natans, Equisetum hyemale, Papyrus antiquorum,* and *Typha latifolia.*

The Mount Desert Nurseries made a seasonal display of herbaceous flowers, among them *Saxifraga pyramidalis* and *S. Macnabiana,* pretty and interesting alpine plants very common in European gardens, but of doubtful hardiness here. They need a covering of snow.

William Whitman and Mrs. E. M. Gill made attractive displays of mixed herbaceous flowers, and Walter Hunnewell showed *Spiraea Veitchii,* one of Wilson's collections in China. This is a distinct and graceful white-flowered species, quite hardy, but up to the present time a very shy bloomer. It evidently will make a large bush. Mr. Hunnewell also displayed *Rhododendron wellesli-anum,* a late-flowering variety, a cross between *R. maximum* and a *R. catawbiense* hybrid.

Sweet Pea Exhibition.

The National Sweet Pea Society held its annual show in Horticultural Hall, July 13 and 14 in connection with the Massachusetts Horticultural Society's exhibition. All the halls were filled to overflowing. The exhibition was a notable success and a good deal of enthusiasm was stirred up which means well for the future and it may not be out of place to insert here part of the review of the show by the veteran sweet pea specialist, Rev. W. T. Hutchins.

The Boston show of last Saturday showed where we actually are in this country. It showed that the American Sweet Pea Society is well on its feet. The confidence with which we turn our faces to the Boston show of 1913 is greater than ever. The exhibit of 1912 was a phenomenal success. Our sweet pea men "produced the goods." I have heretofore written in a solicitous strain; this time I write in the most sanguine vein. Great praise is due the officers of the society, and congratulations should be extended to the Massachusetts Horticultural Society that they have lent their aid to this historic exhibition. And to the man whose faith in the Spencer Sweet Pea has been greatest and whose devotion has been unbounded — W. Atlee Burpee — we owe more than to anyone else. No flower ever had a more inviting opportunity for popularization than the sweet pea of today, and the Boston show proved that it can be popularly grown.

The Society's classes were confined to exhibits of twenty-five sprays in colors and every class was well filled. For the most part the prizes were won by exhibitors from a distance, or beyond the area of severe rainfall which covered the neighborhood of Boston two days before the show and damaged the flowers beyond recovery.

During the judging the committee found there was a lack of agreement as to color among exhibitors. Unfortunately we think most of them had relied upon the color statements as given in seed catalogues and other literature sent out by dealers, rather than upon their own judgment. The result was that many shades of color were found in one entry. Shades of crimson, cerise, carmine, pink, violet, purple, and maroon were much mixed. We would suggest when the Sweet Pea Society again meets in Boston that color cards be displayed in convenient places and that the judges be guided by them.

The names of the winning varieties for the prizes offered by the Massachusetts Horticultural Society were as follow:

White, Nora Unwin; crimson or scarlet, Queen Alexandra Spencer; rose or carmine, John Ingraham; yellow or buff, Primrose Spencer; blue, Romola Piazzani; blush, Duplex Spencer; cerise, Norma; deep pink, George Washington; violet or purple, Duke of Westminster; magenta, Waverley Spencer; mauve, Arthur Green; maroon or bronze, Black Knight; picotee edged, Phenomenal; striped or flaked, red or rose, Aurora; striped or flaked, blue or purple, Prince Olaf.

Rev. W. T. Hutchins' display included Arthur Green, Mrs. Breadmore, Vermilion Brilliant, Gladys Burt, Evelyn Hemus, Rose de Barri, Midnight, Martha Washington, Aurora, America, and Mrs. Higginson.

W. Atlee Burpee's exhibit received the Gold Medal of the Sweet Pea Society and the special prize for the best exhibit in the halls. The best were as follow: white, Iolanthe, Dorothy Eckford, and Nora Unwin; red or salmon, Earl of Chester, Stirling Stent, Barbara, Saint George, Thos. Stevenson, and Vermilion Brilliant; pink, Aurora Spencer, Constance Oliver, Janet Scott Spencer, Gladys Burt, Lovely Spencer, and Duplex Mary Garden; lavender, R. F. Felton, Florence Nightingale, Emily Eckford, Asta Ohn Spencer, and Flora Norton Spencer; blue or purple, Purple Prince and Tennant Spencer; primrose or buff, Primrose Spencer, Mrs. C. W. Breadmore, Queen Victoria Spencer, Lady Knox, and Dobbie's Cream.

A specially select list should include Juliet, salmon, tinted pink; Earl of Chester, reddish salmon; Dorothy, lavender; Othello, dark; Gladys Burt, salmon-pink; Iolanthe and Nora Unwin, white; Lavender Queen, Dobbie's Cream, and Irish Bell, rosy mauve; Helen Pierce, Spencer, and Romola Piazzani, blue.

A Gold Medal was awarded R. & J. Farquhar & Co. for a grand display of a new, hardy white lily, *Lilium myriophyllum*, collected by E. H. Wilson in China. This is the coming white-flowered summer lily and there is hardly another of its merits.

A First Class Certificate went to the Messrs. Farquhar for a small pink-spotted lily of the Turk's Cap type, named *Lilium Duchartrei*, also one of Wilson's collecting.

First Class Certificates were awarded also to the Arnold Arboretum for *Lilium chinense* (Wilson), a small-flowered, orange-spotted variety, and to M. L. Tirrell for a pretty, double, pink variety of *Centaurea Cyanus*, named Tirrell's Pink.

Honorable Mentions were given to the Arnold Arboretum for *Lilium sutchuense*, orange-red and *Lilium Bakerianum*, a tubular, pendulous-flowered, white-spotted species, and to Dr. Harris Kennedy for an artistic display of Japanese irises.

The table decorations were a most interesting feature and attracted much attention. The prize winners were those who used very little material, but good judgment in display. Too much material marked the losing tables.

The Eastern Nurseries of Holliston made a large display of herbaceous flowers, especially hollyhocks.

Gladiolus and Phlox Exhibition.

The Gladiolus and Phlox Exhibition was held August 10 and 11. Messrs. Whitman and Thurlow were the only competitors in phloxes and the quality of the blooms was good. Some of the best varieties were Tapis Blanc, Albion, and Frau Anton Buchner, white; G. A. Strohlein and Baron von Dedem, red; Sweetheart, pink; Richard Wallace, white with pink eye; Elizabeth Campbell, salmon with white center; and Cameron, deep pink with white eye.

Gladioli were shown in quantity by W. H. Darlington, Mamaroneck, N. Y., Clark W. Brown, Ashland, Chamberlain & Gage, Groton, B. H. Tracy, Wenham, Mrs. J. L. Gardner, Brookline, and Mrs. Frederick Ayer, Newton. A Silver Medal was awarded Chamberlain & Gage for gladiolus Mrs. Montague Chamberlain (Gandavensis type). The color is snowy white with a slight line of crimson on the lower petal; the flowers are large and the spike long and full. Honorable Mention was also awarded them for gladiolus Myrtle (Gandavensis), clear rose, white throat, flowers medium in size, and spike long and graceful.

A Bronze Medal was given the Bay State Nurseries for a large display of herbaceous plants of more than 100 kinds, including 35 varieties of phloxes. The Eastern Nurseries made an attractive display of herbaceous plants with 45 kinds. David F. Roy of

Marion was awarded a First Class Certificate for a new begonia, *B. gracilis*, var. Prima Donna, a rosy-pink bedding variety of the *B. semperflorens* type.

The Langwater Gardens of North Easton were given Honorable Mention for an interesting display of new sweet peas, and the same award was made to Walter Hunnewell for *Prunus Lauro-Cerasus* in fruit, a plant very rarely seen; its branches covered with large black fruit were very effective. A Silver Medal was given R. & J. Farquhar & Co. for a large display of *Lilium Henryi*.

Probably the most interesting exhibits in the show were the collections of annuals by Mrs. J. L. Gardner and William Whitman. The first prize collection contained asters in variety, candytuft, balsams, marigolds, mignonette, nasturtiums, poppies, phloxes, petunias, stocks, sweet peas, zinnias, Celosia, Amarantus, Acrolinium, Ageratum, Arctotis grandis, Cacalia, Coreopsis, Centaurea, Helichrysum, Cosmos, and Eschscholzia.

The Dahlia Show.

The Dahlia Show was held September 13–15. It was practically a repetition of the previous year. There is little more to say than that the quality of the blooms was uniformly good and competition close. In varieties the only one worth special mention was a new white, peony-flowered variety for which Luther C. Parker of Lynn was awarded a First Class Certificate.

The show is to be noted for special displays. Among these B. Hammond Tracy's display of gladioli was particularly attractive and the Society's Gold Medal was awarded him for the advancement in culture and use of the gladiolus.

In the exhibit of Mr. Tracy, there were several new varieties of sterling merit, and the whole exhibit was noticeable for splendid culture as well as for new varieties. Mr. Tracy is as pleased as any grower to bring out new varieties of worth, but at Cedar Acres much time and thought are given to perfecting old varieties.

As in many of Mr. Tracy's other exhibits the *use* of the Gladiolus was a strong point. Here old and new varieties were equally prominent. Dawn, a magnificent coral pink, was well staged in a dull green jardinière on a pedestal. Sturdy old Brenchleyensis

was very effective in a basket with oak leaves. A gilded basket filled with the old-fashioned May and tied with ribbon bows made a fine showing. An immense melon basket filled with the "White and light" mixtures, composed of creams and yellows, occupied another prominent position. Immense spikes of the favorite variety, Mrs. Francis King, and a beautiful bunch of the new La Pastele filled beauty vases at each end of the exhibit. La Pastele, a medium sized flower, of long growing spike, is a most pleasing combination of light red with a canary throat. Fireside, a glorious red, made a wonderful effect in a long wicker basket placed against a green background. On a table in one corner were staged several vases of prominent varieties with large flowers, showing the same excellent culture. Bon Silene, a rose cream-colored variety with backs of petals and buds a dull rose, is a fine new variety and one of the most popular at Cedar Acres. Seedling № 157, a large cream with a pointed carmine spot, will be a winning kind when placed on the market. Madam Butterfly, with long spikes of flecked rose, in shape and texture one of the best, was most effectively placed with a large vase of Baron Hulot.

Herbaceous flowers came from the Blue Hill Nurseries, the Eastern Nurseries, the Mount Desert Nurseries, and from William Whitman.

Fottler, Fiske, and Rawson Co. showed a collection of gladioli. The best were Mrs. Frank Pendleton, pink, dark center; Primulinus hybrids, new; America, light pink; Brilliant, deep red; Titania, orange-pink; M. Odinier, brown; and Philadelphus, pink, striped white.

Mrs. Arthur Hunnewell showed a new tuberous-rooted begonia of unknown parentage. The flowers were double, scarlet, and prettily fringed. It makes a neat pot plant and is easily raised from seed.

Mrs. J. L. Gardner made an effective display of tropical plants which was once an important feature of this show, when local gardeners were wont to show their skill. Competition then was unusually close and the interest quite keen.

On October 5 a Silver Medal was awarded E. B. Dane for a splendid specimen plant of *Vanda Sanderiana*.

The Chrysanthemum Show.

The Chrysanthemum Show was held November 7–10. Although not up to the average the quality was excellent. No better specimens were ever seen in the halls of the Society than those shown by Thomas E. Proctor of Topsfield (James Marlborough, gardener).

The Josiah Bradlee Prize was won by Col. H. E. Converse of Marion with as fine blooms as have ever been seen here. The Henry A. Gane Memorial Prize was won by James Nicol of Quincy who has won it every year for the past ten years, and this year with the finest blooms he has ever raised.

W. W. Edgar Co., Edward A. Clark, and James Nicol were the principal competitors for the prizes for long-stemmed blooms in vases and all were of the highest quality.

A Bronze Cultural Medal was awarded James Marlborough for an artistic floral basket plant.

Edgar Brothers of Waverley showed a very fine vase of the pompon chrysanthemum Savannah. It is worthy of note that Savannah was raised by Dr. Henry P. Walcott, once President of the Society, more than twenty years ago. Very few varieties of those days are in existence now.

The chrysanthemum table decorations were judged by a committee of ladies whose report is given herewith.

To the Committee on Prizes and Exhibitions.

Having been requested to award three prizes for the "Best decoration of Chrysanthemums for table of ten covers," we report as follows:

The first prize was awarded for the graceful arrangement of the centre piece with its trailers of large white flowers and green stalks, for the grace and freedom of the ladies' bouquets, and the simplicity of the boutonnières. The table furnishings were rich but subordinated to the flowers, as they should be.

On the tables to which were awarded the second and third prizes, the candle-shades were too conspicuous, the ladies' bouquets were too compact, and on the second table the ribbons were too heavy in texture for the feathery flowers and not the right shade. The colors of the chrysanthemums were very beautiful, but there should have been a freer use of green. On the third table the contrast was too great between the large and small

flowers, and the large chrysanthemums were too large to adapt themselves to a long low centre piece.

The other five tables were open to criticism in one instance for lack of green, in another for the combination of smilax and fine adiantum unsuitable to the chrysanthemums. On one table the decorations were too compressed, on another the tall centre piece was too high in proportion to its surroundings, while on the last table, decorated with white and green, the centre piece was not sufficiently emphasized, though the choice of flowers and green was pretty and harmonious. The doll was absolutely out of place in a flower show.

If permissible, we should like to add the suggestion that in the future the tables should be decorated simply with the flowers in free and graceful arrangement, not limited to the one centre piece, but with the addition of some small vases, if desired, and sprays of green on the white cloth, leaving spaces for the necessary furnishings. This is sometimes done in England.

It seems to us that the use of cutlery, glass, etc. at a flower show is entirely out of place from the scientific or horticultural point of view. It reduces horticulture to a commercial level and benefits neither horticulture nor commerce. As beauty is the result desired by each decorator, it would be well to limit still further the size and position of the commercial cards in order to disturb the artistic effect of the whole as little as possible.

Respectfully submitted,

(Signed) Mary Lee Ware.
Susan H. Long.
Cornelia Bowditch.

Committee for award of prizes to decorated tables.

Besides chrysanthemums there were many noteworthy exhibits.

The Waban Rose conservatories showed their new rose Mrs. Charles Russell. It is a remarkably handsome rose and for commercial purposes comes nearest to the famous American Beauty, though in pedigree it is no relation. It is more graceful in form of flower and can be grown with equally long stems. It is very fragrant and what is still more desirable is its handsome shade of pink. A Gold Medal was awarded it.

A First Class Certificate was given A. N. Pierson Co. of Cromwell, Connecticut, for the new rose Milady. It is a finely-formed, maroon-crimson flower. Commercially it is sure to make a good record. The stems are of moderate length and it is very free blooming.

William Downs, gardener to Edwin S. Webster of Chestnut Hill, was given a First Class Cultural Certificate for begonia Mrs.

Heal. It is reputed a difficult plant to grow, but these were fine specimens.

Thomas Roland made an interesting and pretty display of small-sized, commercial, flowering and foliage plants including Ericas, Cyclamens, Nerines, Dracaenas, Acacias, Begonias, Crotons, palms, and oranges.

Honorable Mention was awarded Duncan Finlayson for an interesting orchid named *Cymbidium erythrostylum*. The flowers were white, the lip spotted with red.

William Sim's display of the Princess of Wales violet in glass holders on an iron rack was very attractive. It was a good way to display them.

Mrs. E. M. Gill made an extensive display of cut chrysanthemums.

Wheeler & Co. of Waban had a pretty table of orchids. This has now become one of the features of this show. It included *Cattleya labiata* in variety, *Oncidium varicosum*, var. *Rogersii*, *Dendrobium phalaenopsis*, and several others. *Cattleya labiata* Mrs. H. A. Wheeler, an albino with a violet lip and white-fringed edge, was given a Silver Medal.

Patten & Co. was awarded a Silver Medal for a handsome crimson carnation named Princess Dagmar.

W. W. Edgar Co.'s display of commercial flowering and foliage plants was tastefully set up and contained Crotons, Begonias, Dracaenas, Azaleas, Euphorbias, Ardisia, Araucarias, Poinsettia, palms, ferns, lilies, and bay trees.

Julius Roehrs Co. of Rutherford, New Jersey, made an exhibit of stove and greenhouse plants.

December 21 George McWilliam of Whitinsville exhibited a pure white Calanthe, *C. Whitinae* (*C. Sandhurstiana* × *Whitiniana*) and was awarded a Silver Medal.

E. B. Dane exhibited Cypripedium Dreadnought (*C. Lecanum*, var. *Clinkaberryanum* × Harefield Hall). It is a large handsome hybrid. The upper sepal is very broad and does not reflex as in most *C. insigne* hybrids. It is light green, spotted purple and margined with white, and the pouch is large, bronzy green. It was awarded a First Class Certificate.

Duncan Finlayson also showed a large collection of *Cypripedium*

insigne varieties and hybrids including *C. insigne,* var. *Coulsonianum, C. i. Philbrickianum, Longwoodense, Eyermanni, Browni, Sandcrae, Aurcola,* Harefield Hall, *Lindeni, Maulei, Dominianum,* and Marion Laselle.

PRIZES AND GRATUITIES AWARDED FOR PLANTS AND FLOWERS.

1912.

January 6.

Gratuities: —

Mrs. J. L. Gardner, display of Cyclamen, $8.
William Whitman, " " " $5.

Midwinter Flower Show.

February 2, 3, and 4.

Primula Kewensis.— Six plants in not less than five-inch pots:
1st, Winthrop Ames, $8; 2d, E. A. Clark, $6.

Primula Sinensis.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, E. J. Mitton, $6.

Primula stellata.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, Mrs. J. L. Gardner, $6.

Primula obconica varieties.— Eight plants in not less than six-inch pots:
1st, William Whitman, $8; 2d, E. A. Clark, $6; 3d, Winthrop Ames, $4.

Begonia Gloire de Lorraine.— Six plants, in pots:
1st, E. A. Clark, $10.

Azalea Indica.— Three plants, distinct varieties, not less than thirty-six inches in diameter (for private growers only):
1st, William Whitman, $12.

Palms.— Pair, in pots or tubs:
1st, William Whitman, $12; 2d, William Whitman, $10.

Cyclamens.— Three plants:
1st, E. J. Mitton, $10; 2d, Mrs. J. L. Gardner, $6.

Freesia refracta alba.— Six six-inch pots:
1st, William Whitman, $6; 2d, Mrs. J. L. Gardner, $4.
Roman Hyacinths.— White, six six-inch pots:
1st, William Whitman, $6; 2d, Mrs. J. L. Gardner, $4.
Polyanthus Narcissus.— Six six-inch pots:
1st, Mrs. J. L. Gardner, $6.
Carnations.— Vase of fifty cut blooms, not less than five varieties, with foliage:
1st, S. J. Goddard, $8; 2d, Strout's, $6.
Vase of twenty-five cut blooms, not less than three varieties (for private growers only):
1st, William Whitman, $5.
Twenty-five blooms of any named dark pink variety (Mrs. Lawson shade):
1st, James Wheeler, $5.
Fifty blooms, any white variety:
1st, Strout's, $5; 2d, S. J. Goddard, $3; 3d, S. J. Goddard, $2.
Fifty blooms, any red variety:
1st, S. J. Goddard, $5; 2d, A. A. Pembroke, $3; 3d, James Wheeler, $2.
Twenty-five blooms, any red variety:
1st, William Whitman, $3.
Fifty blooms, any light pink variety:
1st, S. J. Goddard, $5; 2d, Strout's, $3; 3d, S. J. Goddard, $2.
Twenty-five blooms, any light pink variety:
1st, William Whitman, $3.
Fifty blooms, any dark pink variety:
1st, S. J. Goddard, $5.
Fifty blooms, any crimson variety:
1st, S. J. Goddard, $5.
Fifty blooms, any yellow or yellow variegated variety:
1st, S. J. Goddard, $5.

Gratuities: —

A. A. Pembroke, vase of Carnation Beverly, $5.
Mrs. Oliver Ames Sr., vase of *Euphorbia fulgens*, $3.
F. J. Dolansky, *Cattleya Trianae* and *Gardenia floribunda*, $4.
W. S. Russell, collection of cut Orchids, $4.
H. Huebner, collection of winter-flowering Antirrhinums, $10, and Honorable Mention.
Mrs. J. L. Gardner, specimen Cinerarias, $6.
Francis Skinner, collection of Indian Azaleas, $10.
William Whitman, collection of Primulas, $4.
Mrs. E. M. Gill, display of cut flowers, $3.

February 24.

Gratuity: —

William Whitman, display of *Cineraria stellata*, $15.

Spring Exhibition.

March 22, 23, and 24.

Hyacinths.— Six pans, not exceeding ten inches in diameter, six bulbs of one variety in each pan:

1st, William Whitman, $12; 2d, E. A. Clark, $8; 3d, A. W. Preston, $6.

Single pan, not exceeding twelve inches in diameter, with ten bulbs of one variety:

1st, E. A. Clark, $4; 2d, Mrs. J. L. Gardner, $3; 3d, A. W. Preston, $2.

Single pan, not exceeding ten inches in diameter, with six bulbs of one variety:

1st, William Whitman, $3; 2d, William Whitman, $2; 3d, E. A. Clark, $1.

Two eight-inch pans, two distinct varieties (for amateurs only):

1st, Miss M. A. Rand, $5.

Single Early Flowering Tulips.— Six eight-inch pans, one distinct variety in each pan:

1st, William Whitman, $10; 2d, A. W. Preston, $8; 3d, A. W. Preston, $6.

Joost van Vondel, white, eight-inch pan:

1st, A. W. Preston, $3.

Mon Tresor, eight-inch pan:

1st, A. W. Preston, $3.

Any other yellow variety, eight-inch pan:

1st, William Whitman, Ophir d'Or, $3.

Couleur Cardinal, eight-inch pan:

1st, William Whitman, $3; 2d, A. W. Preston, $2.

Any other red variety, eight-inch pan:

1st, A. W. Preston, Sir Thomas Lipton, $3.

Keizerkroon, eight-inch pan:

1st, William Whitman, $3; 2d, A. W. Preston, $2.

Pink Beauty, eight-inch pan:

1st, J. T. Butterworth, $3; 2d, A. W. Preston, $2.

Any other pink or pink and white variety, eight-inch pan:

1st, A. W. Preston, Queen of the Netherlands, $3.

Duchess of Parma, eight-inch pan:

1st, William Whitman, $3; 2d, A. W. Preston, $2.

Two eight-inch pans, two varieties (for amateurs only):
1st, H. L. Rand, $5; 2d, Miss M. A. Rand, $4; 3d, Miss M. A. Rand, $3.

Narcissuses.— Collection of Large Trumpet varieties, not less than ten eight-inch pots, one distinct variety in each:
1st, William Whitman, $15.

Large Trumpet varieties, four eight-inch pots, one distinct variety in each:
1st, A. W. Preston, $6; 2d, Mrs. J. L. Gardner, $4.

Collection of Short Trumpet varieties, not less than ten eight-inch pots or pans, one distinct variety in each:
1st, William Whitman, $15.

Short Trumpet varieties, four eight-inch pots or pans, one distinct variety in each:
1st, William Whitman, $6; 2d, A. W. Preston, $4.

Two eight-inch pans, two varieties (for amateurs only):
1st, Miss M. A. Rand, $3; 2d, H. L. Rand, $2; 3d, Miss M. A. Rand, $1.

Crocus.— Three eight-inch pans, one distinct variety in each:
1st, Mrs. J. L. Gardner, $4.

Lily of the Valley.— Six six-inch pots or pans:
1st, J. T. Butterworth, $6; 2d, J. T. Butterworth, $4.

Lilium longiflorum.— Six pots:
1st, Francis Skinner, $10.

General display of Spring Bulbous Plants.— All classes, to be arranged with foliage plants:
1st, Mrs. J. L. Gardner, $30; 2d, William Whitman, $20.

Forced Bulbs.— Six pans, six inches in diameter, grown without the aid of a frame or greenhouse (for amateurs only):
1st, Miss M. A. Rand, $10; 2d, H. L. Rand, $8; 3d, Miss M. A. Rand, $6.

Orchids.— Group of plants arranged for effect with ferns or other foliage plants, to cover not less than fifty square feet:
1st, Wheeler & Co., $40 and Silver Medal.

Specimen plant:
1st, Mrs. C. G. Weld, $6; 2d, J. T. Butterworth, $4; 3d, J. T. Butterworth, $2.

Gratuities: —

Mrs. Lester Leland, *Primula obconica*, $8.
Mrs. C. G. Weld, *Cattleya Schroderae*, $2.
M. A. Patten, Carnation Mrs. C. W. Barron, $2.
A. W. Preston, vase of carnation Mrs. C. W. Barron, $1.
Mrs. J. L. Gardner, specimen *Streptosolon Jamesoni*, $4.
Mrs. H. F. Durant, two vases of *Statice Holfordi*, $3.

Francis Skinner, collection of Tausendschön Roses, $5.
Walter Angus, display of cut Camellias and other flowers, $10, and Honorable Mention.
William Walke, display of Begonia President Carnot and other plants, $10.
Louis Dupuy, collection of Hydrangeas and Heaths, $4.
William Walke, vase of Antirrhinums, $2.
James Wheeler, two vases of Antirrhinums, $2.
A. W. Preston, vase of cut Orchids, $1.
Francis Skinner, collection of bulbous plants, $10.
A. Leuthy, display of foliage plants, $20.
Mrs. E. M. Gill, display of cut flowers, $4.

March 30.

Gratuity: —

Edward MacMulkin, display of pot plants, $10.

May Exhibition.

May 11 and 12.

Calceolarias.— Six varieties, in pots:
1st, E. A. Clark, $15; 2d, Mrs. C. G. Weld, $10.
Pansies.— Forty-eight blooms, not less than twenty-four varieties:
1st, Mrs. E. M. Gill, $3.

Gratuities: —

Mrs. C. G. Weld, collection of Himalayan Rhododendrons, $3.
E. A. Clark, display of *Hydrangea Otaksa*, $6.
" " " *Schizanthus Wisetonensis*, $3.
Mrs. C. G. Weld, specimen orchid × Laelio-Cattleya (*L.-C. Hyeana* × *L.-C. Canhamiana rubra*), $3.
E. A. Clark, specimen orchid, *Dendrobium thyrsiflorum*, $3.
T. T. Watt (gardener to Mrs. H. F. Durant), specimen *Cattleya citrina*, $2.
Mrs. E. M. Gill, display of cut flowers, $3.

Peony and Rhododendron Exhibition.

June 8 and 9.

H. H. Hunnewell Fund No. 3.

Rhododendrons.— Largest and best collection, not less than fifteen distinct varieties, six trusses of each, from plants that have been grown in the open in Massachusetts for at least three years:
1st, Francis Skinner, $25.

Hardy Azaleas.— Twelve varieties, six trusses of each:
1st, Francis Skinner, $10.

Society's Prizes.

German Irises.— Twenty-four vases of three trusses each, of not less than twelve varieties:
1st, T. C. Thurlow's Sons Co., $5; 2d, F. J. Rea, $3.

Gratuities: —

T. C. Thurlow's Sons Co., collection of Irises, $2.
Mrs. John Flood, collection of early Herbaceous Peonies and German Irises, $5.
Francis Skinner, collection of Rhododendrons and Ghent Azaleas, $5.
T. C. Thurlow's Sons Co., collection of early Herbaceous Peonies, $5.
Mrs. E. M. Gill, display of cut flowers, $5.

Rose, Peony, and Strawberry Exhibition.

June 22 and 23.

Theodore Lyman Fund No. 2.

Hardy Roses.— Collection, named, not less than twenty varieties, filling fifty vases.:
1st, W. J. Clemson, $20; 2d, William Whitman, $15.

John C. Chaffin Fund.

(For amateurs only.)

Best three blooms of any white Hybrid Perpetual Rose:
1st, Robert Seaver, $5.
Best three blooms of any pink Hybrid Perpetual Rose:
1st, Robert Seaver, $5; 2d, Robert Seaver, $3.

Best three blooms of any red Hybrid Perpetual Rose:
1st, Robert Seaver, $5; 2d, Robert Seaver, $3.
Basket of Hybrid Perpetual Roses, artistically arranged:
1st, Robert Seaver, $5.

Society's Prizes.

Hybrid Perpetual, twelve named varieties, three of each:
1st, W. J. Clemson, $12; 2d, William Whitman, $8.
Six named varieties, three of each:
1st, William Whitman, $6.
Twelve named varieties, one of each:
1st, A. F. Estabrook, $4.
Six named varieties, one of each:
1st, Robert Seaver, $3; 2d, William Whitman, $2.
Hybrid Tea, six blooms, any pink variety:
1st, A. F. Estabrook, $3; 2d, Robert Seaver, $2; 3d, Robert Seaver, $1.
Six blooms any red variety:
1st, A. F. Estabrook, $3.
General display, one hundred bottles of Hardy Roses:
1st, Mrs. Frederick Ayer, $15; 2d, W. J. Clemson, $10; 3d, Mrs. E. M. Gill, $8.

Sweet Williams.— Display, eighteen vases of three trusses each, not less than six varieties:
1st, William Whitman, $3; 2d, A. W. Preston, $2.

Hardy Herbaceous Flowers.— Twenty-five vases, distinct species and varieties, not less than ten genera:
1st, F. J. Rea, $8.

Herbaceous Peonies.— Collection of twenty named varieties, double, one flower of each:
1st, T. C. Thurlow's Sons Co., $10; 2d, William Whitman, $6.
Collection of ten named varieties, double, three flowers of each:
1st, T. C. Thurlow's Sons Co., $10; 2d, A. W. Preston, $6.
Collection of ten named varieties, double, three flowers of each:
1st, T. C. Thurlow's Sons Co., $10; 2d, A. W. Preston, $6.
Collection of twelve named varieties, single, one flower of each:
1st, T. C. Thurlow's Sons Co., $4.
Collection of six named double varieties, white, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.
Collection of six named double varieties, rose pink, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.
Collection of six named double varieties, salmon pink, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.
Collection of six named double varieties, red or crimson, one flower of each:
1st, T. C. Thurlow's Sons Co., $3.

Vase of twenty-five blooms, double, white or blush:
1st, T. C. Thurlow's Sons Co., $5; 2d, T. C. Thurlow's Sons Co., $3; 3d, A. F. Estabrook, $2.
Vase of twenty-five blooms, double, pink or rose:
1st, William Whitman, $5; 2d, T. C. Thurlow's Sons Co., $3.
Vase of twenty-five blooms, double, red or crimson:
1st, T. C. Thurlow's Sons Co., $5; 2d, William Whitman, $3; 3d, T. C. Thurlow's Sons Co., $2.
Vase of twenty-five blooms, double, any other color:
1st, T. C. Thurlow's Sons Co., $5.
Collection of twelve named varieties, double, one flower of each. (For non-commercial growers only):
1st, William Whitman, $6; 2d, A. W. Preston, $4.
Campanula Medium.— Collection, filling twelve vases:
1st, William Whitman, $4; 2d, A. W. Preston, $3.

Gratuities: —

Duncan Finlayson, collection of Hybrid Roses, $25.
A. F. Estabrook, collection of Roses, $3.
Mrs. Frederick Ayer, " " " $3.
Mrs. W. H. Coffin, spray of Climbing Rose, $1.
A. F. Estabrook, collection of Hybrid Tea Roses, $1.
Mrs. J. B. David, display of Roses, $1.
T. C. Thurlow's Sons Co., collection of Peonies, $10.
Mrs. James McKissock, display of Peonies, $4.
J. S. Chase, Peony Mme. Lorraine, $1.
Mrs. E. M. Gill, display of Roses and Peonies, $6.
Robert Cameron, group of Fuchsias, $15.
" " display of Water Lilies, $10.
J. T. Butterworth, display of Spanish Iris, $3.
A. W. Preston, display of Gloxinia blooms, $1.
William Whitman, display of herbaceous flowers, $12.

Sweet Pea Exhibition.

July 13 and 14.

Sweet Peas.— Decoration for table of ten covers:
1st, Duncan Finlayson, Silver Medal of the National Sweet Pea Society and $40; 2d, Mt. Desert Nurseries, Bronze Medal of the National Sweet Pea Society and $30; 3d, Mrs. C. G. Rice, $20.

John Allen French Fund.

Twenty-five sprays, any white variety:
1st, Frank Foster, $4; 2d, Giraud Foster, $3; 3d, W. J. Burton, $2.

Twenty-five sprays, any crimson or scarlet variety:
1st, Mrs. Lester Leland, $4; 2d, Giraud Foster, $3; 3d, William Gray, $2.
Twenty-five sprays, any rose or carmine variety:
1st, Frederick Mason, $4; 2d, W. T. Burton, $3; 3d, W. T. Burton, $2.
Twenty-five sprays, any yellow or buff variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, W. J. Clemson, $2.
Twenty-five sprays, any blue variety:
1st, Giraud Foster, $4; 2d, Mrs. Lester Leland, $3; 3d, Edward Parker, $2.
Twenty-five sprays, any blush variety:
1st, Mrs. Lester Leland, $4; 2d, W. J. Clemson, $3; 3d, Mrs. Lester Leland, $2.
Twenty-five sprays, any cerise variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Winthrop Ames, $2.
Twenty-five sprays, any deep pink variety:
1st, Giraud Foster, $4.
Twenty-five sprays, any cream pink variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Mrs. P. G. Forbes, $2.
Twenty-five sprays, any orange variety:
1st, Giraud Foster, $4; 2d, Frank Foster, $3; 3d, W. T. Burton, $2.
Twenty-five sprays, any lavender variety:
1st, W. T. Burton, $4; 2d, W. T. Burton, $3; 3d, Mrs. P. G. Forbes, $2.
Twenty-five sprays, any violet or purple variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Mrs. Lester Leland, $2.
Twenty-five sprays, any magenta variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Winthrop Ames, $2.
Twenty-five sprays, any mauve variety:
1st, W. T. Burton, $4; 2d, Giraud Foster, $3; 3d, Mrs. Lester Leland, $2.
Twenty-five sprays, any maroon or bronze variety:
1st, S. P. Shotter, $4; 2d, Giraud Foster, $3; 3d, Winthrop Ames, $2.
Twenty-five sprays, any picotee-edged variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3.
Twenty-five sprays, any striped or flaked red or rose variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Winthrop Ames, $2.
Twenty-five sprays, any striped or flaked blue or purple variety:
1st, S. P. Shotter, $4; 2d, Giraud Foster, $3; 3d, Mrs. Lester Leland, $2.
Twenty-five sprays, any fancy variety (having three colors):
1st, S. P. Shotter, $4; 2d, Giraud Foster, $3.
Twenty-five sprays, any bicolor variety other than picotee-edged:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, W. T. Burton, $2.

Twenty-five sprays, any marbled or mottled variety:
1st, Giraud Foster, $4; 2d, S. P. Shotter, $3; 3d, Winthrop Ames, $2.

Gratuities: —

W. T. Hutchins, collection of Sweet Peas, $10.
Boston Cut Flower Co., " " " " $10.
William Whitman, " " " " $ 4.
" " display of Hydrangeas and Palms, $50.
Dr. Harris Kennedy, artistic display of Japanese Iris, $5, and Honorable Mention.
Mt. Desert Nurseries, display of Japanese Iris, $5, and Honorable Mention.
Eastern Nurseries, display of Hollyhocks, $3.

August 10 and 11.

Perennial Phloxes.— Twelve named varieties, one truss of each:
1st, William Whitman, $4; 2d, T. C. Thurlow's Sons Co., $3.
General display, in not less than thirty vases, named:
1st, T. C. Thurlow's Sons Co., $8.
Gladioli.— Twelve named varieties, one spike of each:
1st, B. H. Tracy, $3; 2d, C. W. Brown, $2; 3d, H. Darlington, $1.
Display of named and unnamed varieties filling one hundred vases, arranged for effect with any foliage.
1st, B. H. Tracy, $8.
China Asters.— Display of Large Flowered of all classes, named, not less than fifty vases, three flowers in each:
1st, A. W. Preston, $6; 2d, H. Darlington, $4.
Annuals.— General display, named, not less than thirty species, filling not less than one hundred bottles:
1st, Mrs. J. L. Gardner, $10; 2d, William Whitman, $8.
Vase arranged for effect:
1st, Miss H. B. Winter, $3.

Gratuities: —

Mrs. J. L. Gardner, vase of Gladiolus Kunderdi, $1.
B. H. Tracy, display of Gladioli, $5.
Mrs. Frederick Ayer, display of Gladioli, $1.
William Whitman, display of Herbaceous Phlox and Gladioli, $5.
A. W. Preston, display of Gloxinia blooms and Single Asters, $3.
E. L. Lewis, display of Sweet Peas, $3.
Bay State Nurseries, display of herbaceous flowers, $10, and Bronze Medal.
Eastern Nurseries, display of herbaceous flowers, $10.
William Whitman, display of cut flowers, $6.
Mrs. E. M. Gill, " " " " $4.

Dahlia and Fruit Exhibition.

September 13, 14, and 15.

Dahlias.— Show or Fancy, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, A. E. Johnson, $3; 3d, J. K. Alexander, $2.
Show, twelve blooms, named varieties:
1st, W. F. Hall, $3; 2d, E. W. Ela, $2; 3d, W. H. Symonds, $1.
Cactus, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, J. K. Alexander, $3; 3d, Charles Lindvall, $2.
Cactus, twelve blooms, named varieties:
1st, E. W. Ela, $3; 2d, J. K. Alexander, $2.
Decorative, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, A. E. Johnson, $3; 3d, W. H. Cruff, $2.
Decorative, twelve blooms, named varieties:
1st, W. F. Hall, $3; 2d, E. W. Ela, $2; 3d, W. H. Symonds, $1.
Peony-flowered, twenty-four blooms, named varieties:
1st, W. D. Hathaway, $4; 2d, J. K. Alexander, $2.
Pompon, twenty-four vases of three blooms each, named varieties:
1st, J. K. Alexander, $4; 2d, W. D. Hathaway, $3.
Pompon, twelve vases of three blooms each, named varieties:
1st, E. W. Ela, $3; 2d, W. C. Winter, $2.
Single twenty-four vases of three blooms each, named varieties:
1st, J. K. Alexander, $4.
Single, twelve vases of three blooms each, named varieties:
1st, E. W. Ela, $3; 2d, W. C. Winter, $2.
Largest and best collection of named varieties, one vase of each:
1st, E. F. Dwyer & Son, $8; 2d, G. H. Walker, $6.

Gratuities: —

J. K. Alexander, display of Dahlias, $15.
W. D. Hathaway, " " " $ 5.
Fottler, Fiske, Rawson Co., display of Dahlias, $5.
Mary C. Caswell, collection of 1912 Dahlias, $2.
Fottler, Fiske, Rawson Co., display of Gladioli, $8.
T. E. Proctor, display of *Campanula pyramidalis*, $5.
Mrs. Frederick Ayer, specimen *Begonia Rex*, $3.
T. E. Proctor, display of Ferns, $5.
Mrs. J. L. Gardner, display of tropical plants, $25.
Julius Heurlin, collection of herbaceous flowers, $8.
Mt. Desert Nurseries, " " " " $8.
Eastern Nurseries, " " " " $8.
William Whitman, display of cut flowers, $15.
Mrs. E. M. Gill, " " " " $ 5.

Fruit and Vegetable Exhibition.

October 4, 5, and 6.

Gratuities: —

William Whitman, two plants of *Caryota urens*, $5.
Mrs. J. L. Gardner, display of Orchids, Palms, and Ferns, $10.
William Whitman, display of cut flowers, $5.

Chrysanthemum Show.

November 7, 8, 9, and 10.

Foliage and Flowering Plants.— Best arranged group, covering three hundred square feet:
1st, W. W. Edgar Co., $50; 2d, Edward MacMulkin, $35.
Best arranged group, covering one hundred and fifty square feet:
1st, Mrs. J. L. Gardner, $40.

Orchids.— Best table of Orchids, both plants and flowers, six or more genera, accurately named:
1st, Wheeler & Co., $50; 2d, Edward MacMulkin, $40.

Chrysanthemums.— Group of plants to cover three hundred square feet:
1st, Walter Hunnewell, $60 and Silver Medal.
Four specimen plants, any color or class:
1st, T. E. Proctor, $60.
Two specimen plants, any color or class:
1st, T. E. Proctor, $30.
One specimen plant, yellow:
1st, T. E. Proctor, $15.
Twenty-five plants, commercial specimens, in not less than six varieties: in not over eight-inch pots:
1st, W. H. Elliott, $30.
Twelve plants, single-flowering sorts, not less than three varieties:
1st, W. H. Elliott, $15.
Six plants, of six different varieties, grown to six stems with one bloom to each stem, in seven-inch pots:
1st, Mrs. Lester Leland, $10.

Kentias.— Two plants, eight feet high or over:
1st, Mrs. Frederick Ayer, $15; 2d, William Whitman, $12; 3d, W. W. Edgar Co., $10.

Arecas.— One or more plants eight feet high or over:
1st, Duncan Finlayson, $15; 2d, A. F. Estabrook, $12; 3d, Mrs. Frederick Ayer, $10.

Begonias.— Gloire de Lorraine, three plants:
1st, J. S. Bailey, $10; 2d, E. A. Clark, $8.
Glory of Cincinnati, three plants:
1st, E. A. Clark, $10.

Samuel Appleton Fund.

Best Chrysanthemum plant on exhibition:
T. E. Proctor, Silver Medal.

Josiah Bradlee Fund.

Chrysanthemums.— Twenty-five blooms, of twenty-five distinct varieties, named:
1st, H. E. Converse, $20; 2d, E. A. Clark, $15.

Henry A. Gane Memorial Fund.

For the best vase of blooms of the Mrs. Jerome Jones or the Yellow Mrs. Jerome Jones:
1st, James Nicol, $20; 2d, W. S. Russell, $10.

Society's Prizes.

Twelve blooms, Japanese, named:
1st, H. E. Converse, $8.
Twelve blooms, Japanese Incurved, named:
1st, H. E. Converse, $8.
Twelve blooms, Reflexed, named:
1st, Mrs. Lester Leland, $8.
Twelve sprays or branches of Pompon, distinct varieties:
1st, E. K. Butler, $5; 2d, Edgar Bros., $3; 3d, Edgar Bros., $2.
Vase of ten blooms on long stems, pink, named:
1st, James Nicol, $10; 2d, W. W. Edgar Co., $8; 3d, E. A. Clark, $6.
Vase of ten blooms, red:
1st, Edgar Bros., $10; 2d, Edgar Bros., $8; 3d, E. A. Clark, $6.
Vase of ten blooms, white:
1st, James Nicol, $10; 2d, E. A. Clark, $8; 3d, W. W. Edgar Co., $6.
Vase of ten blooms, yellow:
1st, W. S. Russell, $10; 2d, W. W. Edgar Co., $8; 3d, E. A. Clark, $6.
Vase of ten blooms any other color:
1st, W. W. Edgar Co., $10; 2d, E. A. Clark, $8.
Twelve vases Singles, twelve distinct varieties, six cut sprays each:
1st, E. D. Jordan, $10.
Best decoration of Chrysanthemums for table of ten covers:
1st, Edward MacMulkin, $40; 2d, H. R. Comley, $30; 3d, F. H. Houghton, $20.
Best vase of seventy-five Chrysanthemum blooms in the Society's large China vases:

1st, W. W. Edgar Co., $40; 2d, W. W. Edgar Co., $30; 3d, Edgar Bros., $20.

Best basket of Chrysanthemums, tasteful arrangement to be considered: 1st, Boston Cut Flower Co., $10; 2d, The Rosary, $8; 3d, Edward MacMulkin, $6.

Gratuities: —

Mrs. Frederick Ayer, display of single Chrysanthemums, $10.
A. N. Pierson Inc., display of cut Chrysanthemums, $8.
Edgar Bros., vase of Pompon Chrysanthemums, $3.
Mrs. E. M. Gill, display of cut Chrysanthemums, $5.
Edgar Bros., vase of Chrysanthemums, $1.
Julius Roehrs Co., display of Orchids, $5.
T. T. Watt, display of cut Orchids, $4.
A. M. Davenport, display of Begonia Gloire de Lorraine, $10.
Mrs. Francis Peabody, display of Begonia Gloire de Lorraine, $3.
Duncan Finlayson, display of Begonia Gloire de Lorraine and *Phoenix Roebelenii*, $10.
E. A. Clark, group of Palms and Begonias, $10.
William Sim, display of Violet Princess of Wales, $10.
Thomas Roland, display of commercial flowering and foliage plants, $40.
William Whitman, display of flowering and foliage plants, $20.
Mrs. J. L. Gardner, specimen Fern, $4.
Edward MacMulkin, pair of Palms, $8.
Mrs. E. M. Gill, basket of flowers, $5.

DECEMBER 21.

Gratuity: —

Duncan Finlayson, collection of *Cypripedium insigne* varieties and *Laelia anceps* varieties, $15.

Additional Awards.

GOLD MEDALS.

March 22. R. & J. Farquhar & Co., Italian Garden.
July 13. " " " " *Lilium myriophyllum.*
September 13. B. H. Tracy, collection of Gladioli.
November 7. Waban Rose Conservatories, new Rose Mrs. Charles Russell.

SILVER MEDALS.

March 22. R. & J. Farquhar & Co., *Clematis Armandi* var. *Farquhari.*
" " " " " " collection of Cyclamens.
" " Louis Dupuy, *Hydrangea hortensis* Mme. Mouillere.

May 11. T. T. Watt, specimen Orchid, *Oncidium Marshallianum.*
August 10. R. & J. Farquhar & Co., display of *Lilium Henryi.*
" " Chamberlain & Gage, *Gladiolus Gandavensis* Myrtle.
October 4. E. B. Dane, *Vanda Sanderiana.*
November 7. Wheeler & Co., *Cattleya labiata* var. Mrs. H. A. Wheeler.
" " Patten & Co., Carnation Princess Dagmar.
December 21. George McWilliam, *Calanthe Whitinae* (*C. Sandhurstiana* × *C. Whitincana*).

Silver Medal of the Society of American Florists.

November 7. George Melvin, *Solanum Capsicastrum* var. *Melvinii.*

Bronze Medals.

June 8. R. & J. Farquhar & Co., collection of double Pyrethrums.
" " J. T. Butterworth, specimen *Miltonia vexillaria.*
June 22. W. N. Craig, collection of Sweet Peas.
" " Mt. Desert Nurseries, display of German Irises and herbaceous plants.
November 7. James Marlborough, artistic, floral, basket Chrysanthemum plants.

First Class Certificates of Merit.

March 22. C. H. Totty, Carnation Wodenethe.
" " Peter Fisher, Carnation Benora.
" " Weld Garden, specimen *Primula malacoides.*
June 22. E. J. Shaylor, Peony Tourngalle.
" " " " " " Soulange.
July 13. R. &. J. Farquhar & Co., *Lilium Duchartrei.*
" " Arnold Arboretum, *Lilium chinense.*
" " M. L. Tirrell, *Centaurea Cyanus* Tirrell's Pink.
August 10. D. F. Roy, *Begonia gracilis* Prima Donna.
" " Chamberlain & Gage, *Gladiolus Gandavensis* Mrs. Montague Chamberlain.
September 13. L. C. Parker, new peony-flowered Dahlia Houghton.
November 7. A. N. Pierson Inc., new Rose Milady.
December 21. E. B. Dane, Cypripedium Dreadnaught (*C. Leeanum Clinkaberryanum* × *C. insigne* Harefield Hall).

Cultural Certificates.

February 2. Alexander McKay, superior cultivation of Begonia Gloire de Lorraine.
March 22. James Marlborough, vase of Antirrhinums.
" " Duncan Finlayson, *Dendrobium Wardianum.*
" " " " " *nobile* var. *nobilius.*

May 11. James Marlborough, specimens of *Adiantum Farleyense.*
November 7. William Downs, Begonia Mrs. Heal.

Honorable Mention.

February 2. Knight & Struck Co., collection of *Erica codonodes Veitchii.*
March 22. Walter Hunnewell, collection of *Acacia heterophylla.*
" " Mrs. C. G. Weld, Rose Veilchenblau.
" " Weld Garden, Calanthe Baron Schroder var. *albescens.*
" " J. T. Butterworth, Cypripedium Van Dyke.
" " Walter Angus, display of cut Camellias and other flowers.
" " Louis Dupuy, display of Hydrangeas.
" " Hatcher, florist, display of *Asparagus Hatcheri.*
" 30. Walter Hunnewell, *Rhododendron sinensis*, from seed collection made by E. H. Wilson in China.
June 8. R. & J. Farquhar & Co., collection of German Irises.
" " Walter Hunnewell, collection of Rhododendrons.
" 22. E. J. Shaylor, collection of Peonies.
" " Mt. Desert Nurseries, specimen *Saxifraga pyramidalis.*
" " R. & J. Farquhar & Co., display of Peonies.
July 13. " " " " *Lilium sutchuenense.*
" " " " " " *Araucaria excelsa* Silver Star.
" " Arnold Arboretum, *Lilium Bakerianum.*
August 10. Walter Hunnewell, display of *Prunus Lauro-cerasus* in fruit.
" " Langwater Gardens, display of Sweet Peas.
" " Chamberlain & Gage, seedling Gladiolus No. 301.
September 13. Mrs. Arthur Hunnewell, seedling hybrid *Begonia Lloydii.*
November 7. L. C. Midgeley, Carnation Eureka.
" " Duncan Finlayson, *Cymbidium erythrostylum.*

Vote of Thanks.

March 22. Robert Rust, two vases of Chrysanthemums.
June 8. R. & J. Farquhar & Co., vase of *Lilium Sargentiae.*
" " " " " " collection of herbaceous flowers.
" 22. Walter Hunnewell, blooms of *Rhododendron maximum Welleslianum.*
July 13. Julius Roehrs Co., collection of Orchids.

T. D. Hatfield
Arthur H. Fewkes
William Nicholson
Thomas Roland
William C. Rust
William Sim

Committee on Plants and Flowers.

THE ITALIAN GARDEN, MARCH, 1912

REPORT OF THE COMMITTEE ON FRUITS FOR THE YEAR 1912.

By Edward B. Wilder, Chairman.

The early spring rains gave hope of a better year for fruit than the last one, but again we had to contend with severe summer droughts.

The fruit trees bloomed profusely, but in some sections of the State there was very little fruit, especially was this true of the pear crop.

Your committee, however, is glad to report a decided improvement in the exhibitions of the year, with a marked increase of interest on the part of the public. The display of fruit at the Midwinter Flower Show was excellent, comprising 27 plates of apples, 4 plates of pears, and a collection of apples consisting of 24 distinct varieties, 3 specimens of each, kept over from the Autumn Exhibition of 1911.

Among these varieties we note Newtown Pippin, Rome Beauty, Northern Spy, Peck Pleasant, Fall Harvey, Fisher, Green Sweet, York Imperial, Pennock, Wagener, Stark, Mann, and Gano. It is remarkable that fruit exhibited before in the Hall should keep for months, without the use of cold storage and then be suitable to show again, which fact speaks well for the keeping qualities of these varieties.

Three prizes for Collection of Winter Apples were awarded. First to Elliott & H. Ward Moore of Worcester, Second to George V. Fletcher of Belmont, and Third to H. A. Clark of Belmont.

Dr. W. G. Kendall of Atlantic again exhibited fine Bosc pears, Edward E. Cole of Greenbush, Holland Pippin Apples, and H. A. Clark a basket of Northern Spy apples.

At the May Exhibition, May 11–12, Thomas E. Proctor of Topsfield had a fine dish of Marshall strawberries grown under glass.

The show of strawberries at the exhibition June 22–23 was not as good as usual owing largely to the unfavorable season.

The Hub strawberry grown by Samuel H. Warren of Weston took the prize for any variety of strawberry introduced since 1908.

The Warren strawberry also grown by the same exhibitor took the prize for the best new strawberry not yet introduced and seemed a very promising variety. Speaking of it Mr. Warren said, "it is good flavor and form, solid and productive."

E. S. Webster of Brookline (William Downs, gardener) displayed a very fine basket of Marshall strawberries; George V. Fletcher Guigne Noir, and J. Henry Fletcher of Belmont Queen Anne cherries.

Elliott & H. Ward Moore took a number of first prizes including the one for collection of six varieties of strawberries.

Much interest was shown in the exhibit of Wilfrid Wheeler of Concord, comprising seven trays, totalling 126 quarts, of six varieties of strawberries, for which the committee awarded him a Silver Medal.

Very unfavorable criticism was made by exhibitors because of the elimination from the Schedule of the July Show of currants, gooseberries, raspberries, and other fruits.

At the Sweet Pea Show, July 13–14, William Whitman of Brookline (Martin Sullivan, gardener) exhibited Fay's and White Grape currants.

August 10–11 there was an exeellent display of summer fruits including apples, pears, peaches, plums, nectarines, cherries, and blackberries.

The addition to the Schedule of more varieties of summer apples was successful in bringing out some good fruit, notably fine Yellow Transparent apples from L. F. Priest, Gleasondale, Williams from Wilfrid Wheeler and H. A. Clark, Duchess of Oldenburg from L. F. Priest, also Sweet Bough, Red Astrachan, Gravenstein, Tetofsky, and Bietigheimer. There was also a good display of Clapp's Favorite pears.

August 31 James Garthly of Fairhaven made a fine display of melons consisting of the varieties Mrs. H. H. Rogers and Honey Drop.

At the Dahlia and Fruit Exhibition, September 13–15, Thomas

E. Proctor of Topsfield (James Marlborough, gardener) made a magnificent display of fifteen varieties of hothouse grapes occupying the stage and a long table in the Lecture Hall.

The exhibit was beautifully arranged with a background of Maiden Hair ferns and other plants and received the first and second prizes in its class.

George V. Fletcher made a fine exhibit of seasonable fruit arranged for effect including peaches, pears, apples, grapes, and plums, for which he received first prize.

Very fine collections of apples were shown by Turner Hill Farm, Ipswich, L. F. Priest, and Elliott and H. Ward Moore. There were also excellent individual dishes of the same fruit by these and other exhibitors.

Prominent among the large exhibits of peaches were the very fine dishes of Champion, Elberta, and Belle of Georgia from H. A. Clark, Carman and Foster from George V. Fletcher, Crawford Early and Lord Palmerston from A. F. Estabrook of Swampscott, and Elberta from F. H. Evans of Malden.

George V. Fletcher had Bradshaw and Yellow Egg plums, while Elliott & H. Ward Moore, Turner Hill Farm, and other exhibitors brought the number of dishes up to forty in this class.

The show of pears was poor owing to the unfavorable season. Elbridge Torrey of Dorchester showed good Clapp's Favorite, F. W. Dahl of Roxbury, Bartlett, Dr. W. G. Kendall, Souvenir du Congrès pears, and Edward R. Farrar of South Lincoln and Joseph H. Chase of Malden, fine grapes.

H. O. Mead of Lunenburg won first prize for the best seedling hardy grape with his Seedling No. 2, a red grape and good bunch resembling the Salem in color. Speaking of it Mr. Mead says: "This Grape is a seedling of Worden and Salem and combines many of the good qualities of its parents. It has the early bearing habit of the Worden together with the vigor and quality of Salem; moreover it is extremely hardy having withstood our severest winters. There seems to be no doubt that this grape will fill a long felt want for an early, high quality red grape."

The committe was gratified to have seven exhibitors of melons. The variety Mrs. H. H. Rogers still takes the lead in a green flesh melon, Wilfrid Wheeler receiving first prize, while very fine speci-

mens of Emerald Gem from Alice A. Warburton of Taunton took second prize.

James Garthly was awarded a Bronze Medal and First Class Cultural Certificate for an excellent show of 29 melons, also Honorable Mention for his seedling melon No. 3.

We were glad to see five collections of apples at the Fruit and Vegetable Show, October 4, 5, 6, 1912, with very close competition for prizes.

In class 318 for best six varieties of fall apples, ripe, Elliott & H. Ward Moore won first and Turner Hill Farm second prize. In class 335 for best six varieties of winter apples, Turner Hill Farm won first, Edward E. Cole second, and Elliott & H. Ward Moore third prize. J. Corey & Son of Truro, Massachusetts, had fine specimens of McIntosh, Blenheim, and Twenty Ounce, while Edward E. Cole showed a beautiful dish of Maiden Blush apples.

The exhibit of pears was good, the first prize for collection going to George V. Fletcher. The Bosc, which continues to grow in the estimation of the public, was largely represented.

Dr. W. G. Kendall had very fine dishes of Elberta and Chair's Choice peaches.

The display of grapes was the largest and best that has been seen in the Hall for years. C. F. Hayward of Ashby had twelve perfect bunches of Concord and six of Niagara grapes, winning first prize in both classes. The first prize for collection of grapes was won by Dr. W. G. Kendall and second by Charles W. Libby of Medford.

A novelty at this time of the year was five varieties of Everbearing strawberries shown by Samuel H. Warren. A very artistic and beautiful grouping of native and foreign fruit was made by Mrs. R. Goodnough of West Roxbury for which great credit is due her. We could wish more persons would follow her example in this artistic work.

A new feature of the Chrysanthemum Show, November 7–10, was the large exhibit of fruit, mostly apples. The Massachusetts State Board of Agriculture and Massachusetts Fruit Growers' Association joined with the Massachusetts Horticultural Society in an exhibit of Massachusetts fruit. There was a total of 215 plates

of apples in the small Hall besides barrels, boxes, baskets, and packages of the same fruit in other parts of the building. Your committee feels warranted in saying these were by far the finest specimens of apples ever shown in the Hall.

There were twelve entries for collection of best six varieties of winter apples, the first prize going to Turner Hill Farm, second to L. F. Priest, and third to A. B. Howard & Son, Belchertown. E. M. Bruce of Leominster won first prize for collection of apples arranged for decorative effect, while Edward McMulkin of Boston took first prize for collection of native and foreign fruit.

A slight idea of the entries may be secured from the fact that there were 24 dishes of Baldwin, 11 of Northern Spy, 10 of Tompkins County King, and 7 of Rhode Island Greening, while there were 35 dishes of any other variety than those classed in the Schedule. The Bay State grown by A. B. Howard & Son is worthy of mention and gives promise of being a great addition to the list of fall apples. We would also mention the Ontario shown by Turner Hill Farm.

There was an excellent show of grapes for November comprising 33 dishes; J. Bauernfeind of Medford having the best collection.

A First Class Certificate of Merit was awarded Charles S. Sargent. of the Arnold Arboretum for specimens of the fruit of *Vitis vinifera* introduced from China, which gives promise of cultural value in New England.

PRIZES AND GRATUITIES AWARDED FOR FRUITS. 1912.

Midwinter Flower Show.

February 2, 3, and 4.

Winter Apples.— For the best collection, not less than four varieties: 1st, E. & H. W. Moore, $5; 2d, G. V. Fletcher, $4; 3d, H. A. Clark, $3.

Gratuities: —

E. E. Cole, Holland Pippin apples, $2.
H. A. Clark, basket of Northern Spy apples, $1.
W. G. Kendall, Bosc pears, $2.
F. W. Dahl, two dishes of pears, $2.

May Exhibition.

May 11 and 12.

Strawberries.— Forced, twelve specimens: 1st, T. E. Proctor, Marshall, $4.

Rose, Peony, and Strawberry Exhibition.

June 22 and 23.

Benjamin H. Pierce Fund.

Strawberries.— Two quarts of any variety introduced since 1908: 1st, S. H. Warren, Hub, $4.

Society's Prizes.

Six baskets of one quart each and of six varieties: 1st, E. & H. W. Moore, $5; 2d, G. V. Fletcher, $4.
For the best new strawberry, not yet introduced; four quarts: S. H. Warren, Warren, Silver Medal.
Two quarts of Abington: 1st, E. & H. W. Moore, $2.
Two quarts of Barrymore: 1st, E. & H. W. Moore, $2; 2d, H. L. Crane, $1.

Two quarts of Black Beauty:
2d, S. H. Warren, $1.
Two quarts of Commonwealth:
1st, G. V. Fletcher, $2.
Two quarts of Downing's Pride:
1st, E. & H. W. Moore, $2.
Two quarts of Glen Mary:
1st, E. & H. W. Moore, $2.
Two quarts of Golden Gate:
1st, E. & H. W. Moore, $2; 2d, John McKenzie, $1.
Two quarts of Marshall:
1st, E. S. Webster, $2; 2d, G. V. Fletcher, $1.
Two quarts of Senator Dunlap:
1st, E. &. H. W. Moore, $2.
Two quarts of any other variety:
1st, S. H. Warren, Big Rock, $3; 2d, H. L. Crane, Grand Marie, $2; 3d, Wilfrid Wheeler, Howard's Seedling No. 7, $1.

Cherries.— Two quarts of any Black variety:
1st, G. V. Fletcher, Guigne Noir, $2.
Two quarts of any White or Yellow variety:
1st, J. H. Fletcher, Queen Ann, $2.

Gratuities: —

J. H. Fletcher, four quarts of Marshall strawberries, $2.
Wilfrid Wheeler, display of strawberries, Silver Medal.

Sweet Pea Exhibition.

July 13 and 14.

Gratuities: —

William Whitman, Fay's and White Grape currants, $3.
J. S. Chase, seedling gooseberry, Honorable Mention.

Gladiolus and Phlox Exhibition.

August 10 and 11.

Apples.— Duchess of Oldenburg:
1st, L. F. Priest, $3.
Red Astrachan:
1st, L. F. Priest, $3; 2d, J. S. Chase, $2; 3d, E. & H. W. Moore, $1.
Sweet Bough:
1st, G. V. Fletcher, $3; 2d, E. & H. W. Moore, $2.

Williams:
1st, Wilfrid Wheeler, $3; 2d, H. A. Clark, $2; 3d, G. V. Fletcher, $1.
Yellow Transparent:
1st, L. F. Priest, $3; 2d, Michael Cahalan, $2.
Any other variety:
1st, W. C. Winter, Tetofsky, $3; 2d, E. & H. W. Moore, Bietigheimer, $2; 3d, G. V. Fletcher, Gravenstein, $1.

Pears.— Clapp's Favorite:
1st, H. A. Clark, $3; 2d, Elbridge Torrey, $2; 3d, G. V. Fletcher, $1.
Any other variety:
1st, W. C. Winter, Giffard, $3; 2d, F. W. Dahl, Dearborn Seedling, $2; 3d, G. V. Fletcher, Boussock, $1.

Peaches.— For the largest and best collection, not less than three varieties, twelve specimens of each variety:
1st, G. V. Fletcher, $6.
Greensboro:
1st, J. S. Chase, $3; 2d, W. G. Kendall, $2.
Any other variety:
1st, F. H. Evans, Herbert Seedling, $3; 2d, J. S. Chase, Carman, $2; 3d, J. S. Chase, Oldmixon, $1.

Plums.— Japanese, Abundance:
1st, Frederick Mason, $3; 2d, W. G. Kendall, $2; 3d, E. & H. W. Moore, $1.
Burbank:
1st, W. G. Kendall, $3; 2d, Frederick Mason, $2; 3d, E. & H. W. Moore, $1.
Any other variety:
1st, E. & H. W. Moore, Shiro, $3; 2d, E. & H. W. Moore, Red June, $2; 3d, W. G. Kendall, Red June, $1.

Blackberries.— Two quarts of any variety:
1st, Mrs. M. W. Chadbourne, Dorchester, $3; 2d, E. & H. W. Moore, Taylor, $2.

Hothouse Fruits.

Nectarines.— Six specimens of one variety:
1st, E. S. Webster, Stanwick Elruge, $5.

Peaches.— Six specimens of one variety:
1st, W. C. Winter, Hale's Early, $5; 2d, W. C. Winter, Greensboro, $4.

Gratuities: —

Mrs. J. W. Birch, peaches, $2.
Wilfrid Wheeler, Late Duke peaches, $1.
Mrs. R. Goodnough, Late Duke peaches, $1.

August 31.

Gratuity: —

James Garthly, collection of melons, $6.

Dahlia and Fruit Exhibition.

September 13, 14 and 15.

John S. Farlow Newton Horticultural Society Fund.

Foreign Grapes.— Collection of not less than four varieties, two bunches each:
1st, T. E. Proctor, $25; 2d, T. E. Proctor, $15.

Benjamin B. Davis Fund.

Grapes.— Best seedling hardy variety, grown at least two years in the open in New England:
H. O. Mead, $10.

Theodore Lyman Fund No. 1.

Apples.— For the best collection of six varieties of fall apples, specimens to be ripe, and twelve of each:
1st, Turner Hill Farm, $10; 2d, L. F. Priest, $8.

Benjamin V. French Fund No. 1.

Apples.— Four varieties, twelve specimens each:
1st, L. F. Priest, $10; 2d, E. & H. W. Moore, $6; 3d, Turner Hill Farm, $4.

Marshall P. Wilder Fund.

Pears.— Bartlett:
1st, F. W. Dahl, $3; 2d, W. G. Kendall, $2; 3d, Elbridge Torrey, $1.
Clapp's Favorite:
1st, Elbridge Torrey, $3; 2d, H. A. Clark, $2; 3d, G. V. Fletcher, $1.

Society's Prizes.

Apples.— McIntosh:
1st, L. F. Priest, $3; 2d, E. &. H. W. Moore, $2; 3d, Turner Hill Farm, $1.
Maiden Blush:
1st, E. E. Cole, $3; 2d, W. G. Kendall, $2; 3d, Turner Hill Farm, $1.

Porter:
1st, H. M. Aldrich, $3; 2d, G. V. Fletcher, $2; 3d, W. C. Winter, $1.
Washington Strawberry:
1st, E. &. H. W. Moore, $3.
Any other variety, Gravenstein excepted:
1st, L. F. Priest, Wealthy, $3; 2d, L. F. Priest, Duchess of Oldenburg, $2; 3d, Turner Hill Farm, Duchess of Oldenburg, $1.

Melons.— Sweet:
1st, Wilfrid Wheeler, Mrs. H. H. Rogers, $3; 2d, Mrs. A. A. Warburton, Emerald Gem, $2; 3d, Wilfrid Wheeler, Honey Drop, $1.

Watermelons: —
1st, Frederick Mason, Santiago, $3; 2d, Frederick Mason, Halbert Honey, $2; 3d, Mrs. A. A. Warburton, Sweetheart, $1.

Pears.— Any variety ripe, Bartlett and Clapp's Favorite excepted:
1st, W. G. Kendall, Souvenir du Congrès, $3.

Peaches.— Collection of not less than four varieties:
1st, G. V. Fletcher, $6; 2d, F. H. Evans, $4.
Carman:
1st, G. V. Fletcher, $3; 2d, W. G. Kendall, $2; 3d, F. H. Evans, $1.
Champion:
1st, H. A. Clark, $3; 2d, G. V. Fletcher, $1.
Crawford's Early:
1st, A. F. Estabrook, $3.
Elberta:
1st, H. A. Clark, $3; 2d, F. H. Evans, $2.
Any other variety:
1st, G. V. Fletcher, Foster, $3; 2d, A. F. Estabrook, Lord Palmerston, $2; 3d, H. A. Clark, Belle of Georgia, $1.

Plums.— Collection of not less than four varieties other than Japanese, twelve specimens of each:
1st, E. & H. W. Moore, $5; 2d, G. V. Fletcher, $3; 3d, Turner Hill Farm, $2.
Single plate of any variety other than Japanese:
1st, G. V. Fletcher, Bradshaw, $3; 2d, G. V. Fletcher, Yellow Egg, $2; 3d, T. D. Hatfield, Moore's Arctic, $1.

Japanese Plums.— Single plate of any variety:
1st, W. T. Hutchinson, October Purple, $3; 2d, M. S. Wheeler, Burbank, $2; 3d, Mrs. A. A. Warburton, Wickson, $1.

Native Grapes.— For the best white grape:
1st, E. R. Farrar, Green Mountain, $3; 2d, Wilfrid Wheeler, Green Mountain, $2; 3d, C. W. Libby, Moore's Diamond, $1.
For the best red grape:
1st, J. S. Chase, Delaware, $3; 2d, J. S. Chase, Brighton, $2; 3d, Mrs. Frederick Ayer, Brighton, $1.
For the best purple grape:
1st, E. R. Farrar, Worden, $3; 2d, J. S. Chase, Worden, $2; 3d, W. G. Kendall, $1.

For the best collection of five varieties, three bunches of each:
1st, E. R. Farrar, $5; 2d, John Bauernfeind, $4; 3d, C. W. Libby, $3.

Fruit.— For the best collection of seasonable fruit arranged for effect with any foliage, not to cover a space larger than four by six feet:
1st, G. V. Fletcher, $15.

Gratuities: —

T. E. Proctor, Prince of Wales peaches, $3.
L. F. Priest, Hyslop crabapples, $1.
James Garthly, display of melons, Bronze Medal and Cultural Certificate of Merit.
James Garthly, seedling melon, Honorable Mention.

Fruit and Vegetable Exhibition.

October 4, 5, and 6.

Theodore Lyman Fund No. 1.

Apples.— For the best collection of six varieties of fall apples, specimens to be ripe, and twelve of each:
1st, E. & H. W. Moore, $12; 2d, Turner Hill Farm, $10.

Samuel Appleton Fund.

Apples.— Baldwin:
1st, E. E. Cole, $3; 2d, Turner Hill Farm, $2; 3d, E. & H. W. Moore, $1.
Hubbardston:
1st, Turner Hill Farm, $3; 2d, J. Corey & Son, $2; 3d, E. & H. W. Moore, $1.
Pears.— Bosc:
1st, W. G. Kendall, $3; 2d, Wilfrid Wheeler, $2; 3d, G. V. Fletcher, $1.
Sheldon:
1st, F. W. Dahl, $3; 2d, C. W. Reed, $2; 3d, Elbridge Torrey, $1.

Benjamin V. French Fund No. 2.

Apples.— Blenheim:
1st, J. Corey & Son, $4.
Golden Russet:
1st, E. E. Cole, $4; 2d, Baker Farm, $3.

R. I. Greening:
1st, Turner Hill Farm, $4; 2d, E. & H. W. Moore, $3; 3d, Baker Farm, $2.

Marshall P. Wilder Fund.

Pears.— Anjou:
1st, F. W. Dahl, $3; 2d, A. F. Estabrook, $2; 3d, E. B. Wilder, $1.
Grapes.— Concord, twelve bunches:
1st, C. F. Hayward, $3; 2d, H. A. Clark, $2; 3d, E. A. Adams, $1.
Green Mountain:
1st, E. R. Farrar, $3; 2d, M. E. Smith, $2; 3d, J. S. Chase, $1.
Worden:
1st, M. E. Smith, $3; 2d, J. S. Chase, $2.

Josiah Bradlee Fund.

Apples.— Northern Spy:
1st, G. V. Fletcher, $3; 2d, H. A. Clark, $2; 3d, H. A. Lamb, $1.

Society's Prizes.

Apples.— For the best six varieties of winter apples, twelve specimens of each:
1st, Turner Hill Farm, $12; 2d, E. E. Cole, $10; 3d, E. &. H. W. Moore, $8.
Belleflower:
1st, W. H. Stone, $3; 2d, E. &. H. W. Moore, $2.
Fall Pippin:
2d, W. C. Winter, $2; 3d, Baker Farm, $1.
Fameuse:
1st, E. E. Cole, $3; 2d, G. V. Fletcher, $2; 3d, E. &. H. W. Moore, $1.
Gravenstein:
1st, E. &. H. W. Moore, $3; 2d, G. V. Fletcher, $2; 3d, E. E. Cole, $1.
Maiden Blush:
1st, E. E. Cole, $3; 2d, Turner Hill Farm, $2; 3d, Baker Farm, $1.
McIntosh:
1st, J. Corey & Son, $3; 2d, E. R. Farrar, $2; 3d, Turner Hill Farm, $1.
Pound Sweet:
1st, G. V. Fletcher, $3.
Roxbury Russet:
1st, Turner Hill Farm, $3; 2d, H. A. Lamb, $2.
Sutton:
1st, Turner Hill Farm, $3; 2d, H. A. Clark, $2; 3d, G. V. Fletcher, $1.
Tompkins County King:
1st, J. Corey & Son, $3; 2d, E. & H. W. Moore, $2; 3d, E. E. Cole, $1.

Twenty Ounce:
1st, J. Corey & Son, $3; 2d, H. A. Clark, $2; 3d, Turner Hill Farm, $1.
Tolman Sweet:
1st, G. V. Fletcher, $3; 2d, E. E. Cole, $2.
Wealthy:
1st, Turner Hill Farm, $3.
Any other variety, ripe:
1st, E. &. H. W. Moore, Washington Strawberry, $3; 2d, E. E. Cole, Alexander, $2; 3d, Arthur Newton, Washington Strawberry, $1.
Any other variety, not ripe:
1st, Turner Hill Farm, Wagener, $3; 2d, Turner Hill Farm, R. I. Greening, $2; 3d, J. Corey & Son, Red Russet, $1.

Pears.— For the best collection of pears, not more than twelve plates, of twelve specimens each, and not less than six varieties:
1st, G. V. Fletcher, $10; 2d, F. W. Dahl, $8; 3d, E. B. Wilder, $6.
Angouleme:
1st, Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Comice:
1st, G. V. Fletcher, $3; 3d, S. D. Crafts, $1.
Dana's Hovey:
1st, G. V. Fletcher, $3; 2d, W. G. Kendall, $2; 3d, J. S. Chase, $1.
Lawrence:
1st, F. W. Dahl, $3; 2d, E. B. Wilder, $2; 3d, E. & H. W. Moore, $1.
Louise Bonne of Jersey:
1st, Elbridge Torrey, $3; 2d, F. W. Dahl, $2.
Marie Louise:
1st, Elbridge Torrey, $3.
Urbaniste:
1st, F. W. Dahl, $3.
Seckel:
1st, C. A. Moore, $3; 2d, F. W. Dahl, $2; 3d, A. F. Estabrook, $1.
Superfin:
1st, A. G. Morse, $3.
Vicar:
1st, E. B. Wilder, $3.
Worden Seckel:
1st, W. G. Kendall, $3.
Any other variety:
1st, E. B. Wilder, Harris, $3; 2d, E. B. Wilder, Belle Lucrative, $2.

Quinces.— Any variety:
1st, G. V. Fletcher, $3; 2d, E. & H. W. Moore, $2; 3d, E. & H. W. Moore, $1.

Peaches.— Any variety:
1st, W. G. Kendall, Elberta, $3; 2d, W. G. Kendall, Crawford, $2; 3d, F. H. Evans, Elberta, $1.

Plums.— Any variety:
1st, W. G. Kendall, October Purple, $3; 2d, E. & H. W. Moore, Monarch, $2; 3d, Mrs. A. A. Warburton, Green Gage, $1.

Native Grapes.— For the best collection of hardy, native grapes, not less than six varieties, of three bunches each:
1st, W. G. Kendall, $10; 2d, C. W. Libby, $8; 3d, M. E. Smith, $6.

Six bunches of Agawam:
1st, W. G. Kendall, $3; 2d, C. W. Libby, $2.

Brighton:
1st, John Bauernfeind, $3; 2d, C. W. Libby, $2; 3d, J. S. Chase, $1.

Campbell's Early:
1st, John Bauernfeind, $3.

Delaware:
1st, W. G. Kendall, $3; 2d, J. S. Chase, $2; 3d, C. W. Libby, $1.

Herbert:
1st, John Bauernfeind, $3; 2d, C. W. Libby, $2; 3d, J. S. Chase, $1.

Isabella:
1st, C. W. Libby, $3; 2d, W. G. Kendall, $1.

Lindley:
1st, C. W. Libby, $3; 2d, M. E. Smith, $2.

Moore's Diamond:
1st, W. G. Kendall, $3; 2d, John Bauernfeind, $2; 3d, C. W. Libby, $1.

Moore's Early:
2d, J. S. Chase, $2.

Niagara:
1st, C. F. Hayward, $3; 2d, M. E. Smith, $2; 3d, H. A. Lamb, $1.

Prentiss:
1st, J. S. Chase, $3.

Salem:
1st, W. G. Kendall, $3.

Vergennes:
1st, J. S. Chase, $3; 2d, W. G. Kendall, $2.

Any other variety:
1st, Mrs. R. Goodnough, Eaton, $3; 2d, W. G. Kendall, Worden, $2; 3d, C. W. Libby, $1.

Foreign Fruit.— Collection of foreign fruit, arranged for effect:
1st, Mrs. R. Goodnough, $15, and Silver Medal.

Gratuities: —

V. J. Loring, basket of grapes, $1.
Mrs. N. P. Cutler, basket of grapes, $1.
Boston Consumptives' Hospital, collection of apples, $3.
S. H. Warren, five varieties of everbearing strawberries, $2.

Chrysanthemum Show.

November 7, 8, 9, and 10.

Samuel Appleton Fund.

Apples.— Baldwin:

1st, Turner Hill Farm, $3; 2d, Alden Derby, $2; 3d, C. H. Leach & Sons, $1.

Hubbardston:

1st, H. J. Andrews, $3; 2d, C. M. Parker, $2; 3d, A. B. Howard & Son, $1.

Pears.— Bosc:

1st, W. G. Kendall, $3; 2d, G. V. Fletcher, $2; 3d, John Bauernfeind, $1.

Sheldon:

1st, J. W. Luther, $3.

Benjamin V. French Fund No. 1.

Apples.— R. I. Greening:

1st, H. J. Andrews, $3; 2d, Alden Derby, $2; 3d, Turner Hill Farm, $1.

Marshall P. Wilder Fund.

Pears.— Anjou:

1st, F. W. Dahl, $3; 2d, G. V. Fletcher, $2; 3d, C. B. Travis, $1.

Society's Prizes.

Apples.— For the best six varieties of winter apples, twelve specimens each:

1st, Turner Hill Farm, $10; 2d, L. F. Priest, $8; 3d, A. B. Howard & Son, $6.

Belleflower:

1st, W. H. Stone, $3; 2d, E. & H. W. Moore, $2.

Pound Sweet:

1st, Mrs. N. B. Winnek, $2; 2d, G. V. Fletcher, $1.

McIntosh:

1st, Alden Derby, $3; 2d, Turner Hill Farm, $2; 3d, L. F. Priest, $1.

Northern Spy:

1st, E. G. Merriam, $3; 2d, E. E. Cole, $2; 3d, G. V. Fletcher, $1.

Roxbury Russet:

1st, L. F. Priest, $3; 2d, C. D. Sias, $2; 3d, E. M. Bruce, $1.

Sutton:

1st, Turner Hill Farm, $3; 2d, H. A. Clark, $2; 3d, A. B. Howard & Son, $1.

Tompkins County King:

1st, A. B. Howard & Son, $3; 2d, N. B. Fisk, $2; 3d, J. H. Fletcher, $1.

Tolman Sweet:
1st, A. B. Howard & Son, $3; 2d, G. V. Fletcher, $2; 3d, E. E. Cole, $1.
Wealthy:
1st, H. J. Andrews, $3; 2d, L. F. Priest, $2; 3d, A. B. Howard & Son, $1.

Pears.— For the best six varieties of winter pears, twelve specimens each:
1st, G. V. Fletcher, $10; 2d, F. W. Dahl, $8.
Angouleme:
2d, F. W. Dahl, $2.
Comice:
1st, G. V. Fletcher, $3.
Dana's Hovey:
1st, G. V. Fletcher, $3; 2d, W. B. Glover, $2; 3d, W. G. Kendall, $1.
Lawrence:
1st, F. W. Dahl, $3; 2d, John Bauernfeind, $2; 3d, Mrs. M. W. Chadbourne, $1.
Seckel:
2d, G. V. Fletcher, $2.
Vicar:
1st, Turner Hill Farm, $3; 2d, Mrs. M. W. Chadbourne, $2.

Quinces.— Any variety:
1st, G. V. Fletcher, $3; 2d, A. B. Howard & Son, $2; 3d, E. & H. W. Moore, $1.

Native Grapes.— Not girdled. For the best collection of hardy, native grapes, not less than three varieties, of three bunches each:
1st, John Bauernfeind, $6; 2d, C. W. Libby, $4; 3d, E. R. Farrar, $3.

Fruit.— Collection of native and foreign fruit, arranged for effect:
1st, Edward MacMulkin, $15 and a Silver Medal.

Apples.— Collection of apples arranged for decorative effect:
1st, E. M. Bruce, $20; 2d, G. V. Fletcher, $15; 3d, L. F. Priest, $10.

Gratuities: —

E. R. Farrar, Canada Red apples, $5.
Turner Hill Farm, Ontario apples, $4.
N. B. Fisk, Fall Pippin apples, $3.
L. J. Branagan, Gravenstein apples, $2.
J. M. Schwartz, Fameuse apples, $1.
Alden Derby, display of apples, $5.
S. H. Warren, Superb (Everbearing) strawberry, $1.
Mrs. R. Goodnough, basket of fruit, $5.
C. S. Sargent, *Vitis vinifera*, First Class Certificate of Merit.

Edward B. Wilder
William Downs
Wilfrid Wheeler
} *Committee on Fruits.*

THE ITALIAN GARDEN, MARCH, 1912

REPORT OF THE COMMITTEE ON VEGETABLES FOR THE YEAR 1912

By Duncan Finlayson, Chairman.

The Committee on Vegetables begs to report that the several exhibitions of vegetables held at Horticultural Hall during the year 1912 were fully up to the high standard of former years.

Five regular exhibitions were held with several smaller ones between the regular shows at which Gratuities and Certificates of Merit were awarded.

The exhibition of June 22 was well attended and excellent vegetables were staged, especially the peas and lettuce from Walter Hunnewell of Wellesley.

The exhibition of August 10 was very creditable and all the classes were well contested. The sweet corn and onions were splendid for that time of the year.

Of course the exhibition of October 4–6 was the largest of the season and the entries in most cases were so uniformly of excellent quality that we found it difficult to decide as to which were the most deserving of the first premiums.

Several new and improved varieties of vegetables were shown during the year. Elliott and H. Ward Moore of Worcester exhibited a new potato named Drought Proof, originated by the F. B. Mills Company, seedsmen of Rose Hill, New York. It was awarded the Levi Whitcomb Prize. It is of uniform size and excellent quality and we believe this new potato a good addition to the already long list of potatoes.

A First Class Certificate was awarded William N. Craig of North Easton for a new tomato, Lister's Prolific. We believe this tomato one of the best new introductions of late years, both for forcing and for out-of-door culture. It is perfect in shape and color, of good quality, and very prolific. It was originated by Alexander Lister of Rothsay, Scotland.

Another improved vegetable was shown by T. D. Hatfield of Wellesley, the Swiss chard Lucullus, said by the exhibitor to be an improvement on the old variety.

We note with pleasure that several new exhibitors appeared this year and with more liberal money prizes we are sure that others can be added to the list of competitors each year.

Your committee feels very proud of the advance made in vegetable growing in Massachusetts in the last few years, both under glass and out of doors, and we note with pleasure the interest taken by private gentlemen in their vegetable gardens. If only the public in general would take more interest in growing fresh vegetables in a small way to supply their own tables the question of the high cost of living would be solved.

We hope the farmer and vegetable grower will get together and show the same enthusiasm that the fruit growers have shown for the last few years and show their products to the public in the most up-to-date way; and where can they do this better than at Horticultural Hall?

We congratulate the Society on the splendid exhibitions of the past year and hope it will give the vegetable department its full share of support during the coming year.

The appropriation for prizes for the year was $590.00 of which was expended $533.00, leaving a balance of $57.00.

A detailed list of awards made during the year is appended to this report.

PRIZES AND GRATUITIES AWARDED FOR VEGETABLES. 1912.

Midwinter Flower Show.

February 2, 3, and 4.

William J. Walker Fund.

Lettuce.— Four heads:
1st, A. W. Preston, $3.
Mushrooms.— Twelve specimens:
1st, E. A. Clark, $3; 2d, F. W. Dahl, $2.
Tomatoes.— Twelve specimens:
1st, A. W. Preston, Princess of Wales, $3; 2d, A. W. Preston, Magnum Bonum, $2.
Vegetables.— Collection of forced vegetables, not less than four varieties:
1st, A. W. Preston, $8.

Gratuity: —

F. W. Dahl, Celeriac, $1.

Peony and Rhododendron Exhibition.

June 8 and 9.

Theodore Lyman Fund No. 2.

Asparagus.— Four bunches, twelve stalks each:
1st, W. J. Clemson, $3; 2d, F. B. Ring, $2; 3d, F. B. Ring, $1.
Beans.— String variety, forced, one quart:
1st, W. J. Clemson, $2.
Beets.— Twelve specimens, open culture:
1st, W. Heustis & Son, $3.
Lettuce.— Four heads:
1st, W. Heustis & Son, $3; 2d, W. J. Clemson, $2; 3d, W. Heustis & Son, $1.
Tomatoes.— Twelve specimens:
1st, W. J. Clemson, $3.

Gratuities: —

Mrs. A. A. Warburton, Rhubarb, $1.
Francis Skinner, collection of vegetables, $2.

Rose, Peony, and Strawberry Exhibition.

June 22 and 23.

Beets.— Twelve, open culture:
1st, W. J. Clemson, $3; 2d, Frederick Mason, $2.
Cabbages.— Four specimens:
1st, G. D. Moore, $3; 2d, W. Heustis & Son, $2.
Cucumbers.— Four specimens:
1st, W. J. Clemson, $3; 2d, G. D. Moore, $2.
Lettuce.— Four heads:
1st, Edward Parker, $3; 2d, E. A. Clark, $2; 3d, Walter Hunnewell, $1.
Peas.— Gradus or Thomas Laxton, fifty pods:
1st, Edward Parker, $3; 2d, Frederick Mason, $2.
Sutton's Excelsior:
1st, Walter Hunnewell, $3; 2d, Frederick Mason, $2.
Any other variety:
1st, Mrs. A. A. Warburton, $3; 2d, Frederick Mason, $2.
Collection of not less than three varieties:
1st, Walter Hunnewell, $5; 2d, W. J. Clemson, $3.

Gratuities: —

Edward Parker, Tomato Lister's Prolific, $1.
W. J. Clemson, collection of vegetables, $4.
W. Heustis & Son, " " " $2.
Mrs. A. A. Warburton, " " " $1.
Langwater Gardens, Tomato Lister's Prolific, First Class Certificate of Merit.

Sweet Pea Exhibition.

July 13 and 14.

Gratuities: —

Mrs. A. A. Warburton, collection of Peas, $2.
William Whitman, collection of vegetables, $5.
Mrs. A. A. Warburton, " " " $4.
" " " " Dobbie's Wonderful Lettuce, Honorable Mention.

Gladiolus and Phlox Exhibition.

August 10 and 11.

Beans.— Two quarts, shelled, not Lima:
1st, Frederick Mason, $3; 2d, E. & H. W. Moore, $2; 3d, Mrs. A. A. Warburton, $1.
Peppers.— Twelve specimens, Bell or Bull Nose:
1st, Frederick Mason, $3; 2d, Oliver Ames, $2.
Twelve specimens, any other variety:
1st, Frederick Mason, $3; 2d, Frederick Mason, $2; 3d, Oliver Ames, $1.
Sweet Corn.— Twelve ears, Crosby:
1st, Col. Frederick Mason, $3; 2d, E. & H. W. Moore, $2.
Twelve ears, any other variety:
1st, F. W. Sargent, Champion, $3; 2d, Frederick Mason, Potter's Excelsior, $2; 3d, E. & H. W. Moore, $1.
Onions.— Twelve specimens:
1st, A. W. Preston, $3; 2d, Frederick Mason, $2; 3d, Mrs. A. A. Warburton, $1.
Collection of Vegetables.— Not less than six varieties, decorative arrangement to be considered:
1st, Oliver Ames, $5; 2d, Frederick Mason, $4; 3d, F. W. Sargent, $3.

Gratuities: —

Mrs. Frederick Ayer, Cucumbers, $1.
Mrs. R. Goodnough, Beans, Kentucky Wonder, $1.
A. W. Preston, Parsley and Cucumbers, $2.
Mrs. A. A. Warburton, collection of vegetables, $3.
Mrs. F. K. Kingman, Green Scallop Squash, Vote of Thanks..

Dahlia and Fruit Exhibition.

September 13, 14, and 15.

Gratuities: —

J. S. Bache, collection of Tomatoes, $3.
William Whitman, collection of vegetables, $6.
Mrs. A. A. Warburton, " " " $3.

Fruit and Vegetable Exhibition.

October 4, 5, and 6.

Collection of Vegetables.— Twelve kinds, not more than one variety of a kind:
1st, Frederick Mason, $25; 2d, Oliver Ames, $15; 3d, Mrs. A. A. Warburton, $10.
Six kinds, distinct species (for cottagers only):
1st, Michael Cahalan, $8; 2d, J. A. Nixon, $6; 3d, D. L. Fiske, $4.

William J. Walker Fund.

Beans.— Lima, any variety, four quarts, pods:
1st, D. L. Fiske, $3; 2d, Frederick Mason, $2.
Lima, any variety, shelled, one quart (for cottagers only):
1st, D. L. Fiske, $2; 2d, Mrs. A. A. Warburton, $1.
Beets.— Any round variety, twelve roots:
1st, Frederick Mason, $3; 2d, W. J. Clemson, $2; 3d, Oliver Ames, $1.
Any round variety, six roots (for cottagers only):
1st, Michael Cahalan, $2; 2d, D. L. Fiske, $1.
Chard.— Three plants:
1st, Frederick Mason, $2.
Brussels Sprouts.— Four quarts:
1st, Francis Skinner, $3; 2d, Frederick Mason, $2.
Cabbage.— Any ball head variety, green, four heads:
1st, Mrs. J. L. Gardner, $3; 2d, Frederick Mason, $2.
Any flat head variety, four heads:
1st, Frederick Mason, $3; 2d, Francis Skinner, $2.
Savoy, four heads:
1st, Francis Skinner, $3; 2d, Mrs. J. L. Gardner, $2.
Red, four heads:
1st, William Whitman, $3; 2d, Frederick Mason, $2.
Any green variety, three heads (for cottagers only):
1st, Michael Cahalan, $3; 2d, Michael Cahalan, $2.
Carrots.— Danvers, twelve roots;
1st, Frederick Mason, $4; 2d, Mrs. Frederick Ayer, $3; 3d, Mrs. A. A. Warburton, $2.
Any red or orange variety longer than Danvers, twelve roots:
1st, Frederick Mason, $4; 2d, Francis Skinner, $3.
Cauliflower.— Three heads:
1st, Frederick Mason, $3; 2d, Francis Skinner, $2.
Celery.— Boston Market, four heads:
1st, E. & H. W. Moore, $3; 2d, W. J. Clemson, $2; 3d, W. Heustis & Son, $1.

Giant Pascal, four heads:
1st, Frederick Mason, $3; 2d, E. & H. W. Moore, $2; 3d, W. Heustis & Son, $1.
Paris Golden or Golden Rose, four heads:
1st, Frederick Mason, $3; 2d, J. A. Nixon, $2; 3d, Mrs. A. A. Warburton, $1.
White Plume, four heads:
1st, W. J. Clemson, $3; 2d, Frederick Mason, $2.

Egg Plant.— Four specimens:
1st, Oliver Ames, $3; 2d, Frederick Mason, $2.

Kohl Rabi.— Six roots:
1st, Frederick Mason, $3; 2d, Oliver Ames, $2.

Lettuce.— Cos or Romaine, six specimens:
1st, Frederick Mason, $3.
Round headed, six specimens:
1st, Frederick Mason, $3; 2d, Oliver Ames, $2; 3d, Oliver Ames, $1.

Onions.— Ailsa Craig, twelve specimens:
1st, W. J. Clemson, $5; 2d, Michael Cahalan, $3; 3d, J. A. Nixon, $2.
Danvers, twelve specimens:
1st, W. J. Clemson, $5; 2d, Oliver Ames, $3; 3d, Frederick Mason, $2.
Any red variety, twelve specimens:
1st, W. J. Clemson, $4; 2d, Frederick Mason, $3; 3d, Oliver Ames, $2.

Parsnip.— Twelve specimens:
1st, Mrs. A. A. Warburton, $4; 2d, Frederick Mason, $3; 3d, Francis Skinner, $2.

Peppers.— Twelve specimens:
1st, Frederick Mason, $4; 2d, Francis Skinner, $3; 3d, Mrs. A. A. Warburton, $2.

Potato.— Early Rose type, twelve specimens:
1st, Frederick Mason, $3; 2d, Frederick Mason, $2; 3d, E. & H. W. Moore, $1.
Green Mountain type, twelve specimens:
1st, Frederick Mason, $3; 2d, Frederick Mason, $2; 3d, E. & H. W. Moore, $1.
Any other variety, twelve specimens:
1st, E. & H. W. Moore, $3; 2d, Frederick Mason, $2; 3d, E. L. Lewis, $1.

Pumpkin or Squash.— Heaviest specimen:
Boston Consumptives' Hospital, $5.
Sugar or winter Luxury:
1st, E. & H. W. Moore, $3.

Salsify.— Twelve specimens:
1st, W. J. Clemson, $3; 2d, Oliver Ames, $2.

Squash.— Bay state, three specimens:
1st, Frederick Mason, $3.

Delicious, three specimens:
1st, Frederick Mason, $3.
Essex Hybrid or Warren, three specimens:
1st, Frederick Mason, $3.
Any other winter variety, three specimens:
1st, Frederick Mason, Marblehead, $3; 2d, Frederick Mason, Marrow, $2.

Tomato.— Any forcing variety grown under glass, three specimens:
1st, Oliver Ames, $4.
Any outdoor scarlet variety, twelve specimens:
1st, Frederick Mason, $3; 2d, Oliver Ames, $2; 3d, Frederick Mason, $1.

Turnip.— Any early white flat or purple top white flat variety, twelve specimens:
1st, E. & H. W. Moore, $3; 2d, Oliver Ames, $2; 3d, Mrs. J. L. Gardner, $1.
Any globe variety, twelve specimens:
1st, E. & H. W. Moore, $3; 2d, J. A. Nixon, $2.
Rutabaga, any variety, six specimens:
1st, Frederick Mason, $3; 2d, Frederick Mason, $2.

Herbs.— Green, fresh; largest and best collection, tastefully arranged, with cards explaining the general use or uses of each variety:
1st, Mrs. A. A. Warburton, $5.

Salad Plants.— Best collection:
1st, Frederick Mason, $6; 2d, J. A. Nixon, $4.

Levi Whitcomb Fund.

Potato.— Best seedling variety, not in commerce, grown for at least two years in New England, twenty-four specimens:
1st, E. & H. W. Moore, $20.

Gratuities: —

J. H. Whipple, Pumpkins, $3.
Boston Consumptives' Hospital, Mammoth Squashes, $2.
T. D. Hatfield, large Vegetable Marrow, $2.
" " " Lucullus Swiss Chard, $2.
William Whitman, collection of vegetables, $6.

CHRYSANTHEMUM SHOW.

NOVEMBER 7, 8, 9, AND 10.

Gratuities: —

Mrs. Frederick Ayer, Italian Wonder Tomato, $2.
Oliver Ames, collection of Onions, $3.
Mrs. A. A. Warburton, collection of vegetables, $6.
William Whitman, " " " $5.

DUNCAN FINLAYSON
WILLIAM N. CRAIG
EDWARD PARKER
} *Committee on Vegetables.*

REPORT OF THE COMMITTEE ON GARDENS FOR THE YEAR 1912.

Charles W. Parker, Chairman.

The Committee on Gardens presents to the Society the following record of its observations made during the past season. Seven visits of inspection have been made to estates and gardens, a considerably less number than in any recent year. The various estates will be briefly described in the order visited and a list of the awards made will be given at the end of the report.

Bayard Thayer's Estate at South Lancaster.

The first visit of the season was made on May 17 to the estate of Bayard Thayer at South Lancaster, Massachusetts. The conspicuous feature of this estate at this time was the May Garden, comprising an area of one acre, planted almost exclusively with spring-flowering bulbous plants.

The garden was divided into sections artistically arranged, with a fine consideration for color effect, and presented a scene of surpassing beauty that will be long remembered. Thousands of bulbs were in full bloom comprising the finest varieties of tulips, narcissi, and hyacinths, and in addition were peonies, irises, and lilacs, of the early flowering kinds.

The members of the committee were conducted through the estate by Mr. and Mrs. Thayer and the tasteful planting and fine condition of the place called forth the most enthusiastic expressions of pleasure. To William Anderson, the superintendent, is also due much praise for the skill displayed in developing this noteworthy estate.

The Little Tree Farms at South Framingham.

On May 28 the committee was invited to visit the Little Tree Farms at South Framingham, carried on by the American Forestry Company of which Theodore F. Borst is the general manager.

Here are fifty acres devoted exclusively to the raising of trees from seed and it is probably the largest tree farm in the country. A hundred or more species of deciduous and evergreen trees are grown by the million and the various operations of planting, transplanting, and shipping were explained most interestingly by Mr. Borst.

The seeds are usually planted in well-prepared plots in the early spring and transplanted at intervals of one and two years until the little trees reach a height of two to three feet which is as large as is desirable for permanent planting.

Wilton Lockwood's Gardens at South Orleans.

June 18 a visit was made to the estate of Wilton Lockwood at South Orleans. The principal object of this visit was to see the garden of peonies which at this date was in the perfection of bloom.

In addition to the three hundred kinds noted the previous year some dozen or more new ones were seen and in its arrangement and in the choice of varieties this peony garden was pronounced by the committee a model of its kind.

While it was somewhat too early in the season for most of the roses several varieties were in fine flower, notably the Carmine Pillar and the Dawson which flourish luxuriantly here. The rose Conrad Ferd. Meyer, a Rugosa hybrid, of a handsome pink color, was conspicuous as was also the Gruss an Teplitz, a deep red rose which flowers all summer until late in the season.

There was also a fine row of the *Iris pallida dalmatica* and on a trellis in front of the house was a bower of the *Wistaria sinensis alba*, its long pendulous racemes presenting a beautiful sight.

Mr. Lockwood's skill and success as a peony and rose grower are worthy of high commendation and the awards made to him by the committee during the last two years are well merited.

Col. Harry E. Converse's Estate at Marion.

June 26 the committee again had the opportunity of inspecting the notable estate of Col. Harry E. Converse at Marion which was awarded the Hunnewell Premium in 1911.

The afternoon was spent in looking over the extensive grounds, noting especially the rose, fruit, and vegetable gardens, as well as the improvements made in the rock and water gardens since the visit of the previous year.

The numerous greenhouses with their collections of flowering and foliage plants and fruits were also inspected and a fine border of larkspurs and peonies attracted attention.

The rose garden was in its prime and presented a magnificent picture. Conspicuous in it were the Mme. Plantier and Frau Karl Druschki in white, Killarney in pink, and the Paul Neyron, Ulrich Brunner, and Victor Hugo in various shades of red and crimson. The Persian Yellow and Wichuraiana hybrid Jersey Beauty were also noted.

The fruit garden of large and small fruits was in fine cultivation. David F. Roy, the superintendent of the estate, finds that in strawberries the Nich Ohmer and Brandywine succeed best here, and of peaches he grows the Elberta, Oldmixon, Stump, Early and Late Crawfords, and the Carman. For plums he recommends the Burbank, and for raspberries, the Cuthbert and Golden Queen.

In the vegetable garden peas were most conspicuous; the melons looked promising; and the usual kinds of culinary vegetables were in good condition for the season.

The rockery, of which mention was made in last year's report, was much improved as was to be expected, for the plants covering it had begun to fill their office in giving shape and beauty to the mass.

The extensive woodlands on the estate have been judiciously thinned and on the borders of the roads plantings of rhododendrons, foxgloves, and sweet williams furnish pleasing touches of coloring. Numerous small trees of catalpa seem to take well here and *Rosa rugosa alba* and *rubra* find a congenial home. For planting along the seashore in masses this last species is especially well adapted

and for a hedge plant in exposed points is unexcelled. It is handsome in flower, leaf, and fruit and is not troubled by insect pests.

The generous hospitality and personal interest of Col. Converse on this occasion were greatly appreciated by the committee.

Andrew Gray Weeks' Estate at Marion.

On June 26 the committee also took the opportunity for a brief visit to the estate of Andrew Gray Weeks at Marion. The most important improvement made in this estate since the visit of last year is the completion of the sea wall, thereby permitting the extension of the lawn to the very water's edge. This great expanse of lawn with its planting of trees and shrubs is one of the features of this seashore home.

In the rear of the mansion house is a luxurious growth of native trees and shrubs with many introduced garden species planted along the numerous woodland paths. Conspicuous among them were the ostrich and maidenhair ferns, Japanese irises, and foxgloves.

R. & J. Farquhar & Co's Nurseries at Roslindale.

On July 25 the committee, on invitation of Messrs. R. & J. Farquhar & Co., visited their grounds at Roslindale to inspect the collection of lilies from western China. Mr. Arthur H. Fewkes, a member of the committee, reports upon the visit as follows:

The visit was made in company with the members of the Committee on Plants and Flowers of the Society to whom were added Mr. E. H. Wilson, the collector of the lilies, and Mr. Chun, a young Chinese student at Amherst College. It was pleasant to be favored with Mr. Chun's presence on this occasion and to be able to show him these beautiful flowers tranplanted from his own land and thriving in their new environment as though they were natives of the soil.

On reaching the grounds the lilies were found growing by the thousand and attention was particularly called to the plantation of the variety which it is proposed to call *Lilium Sargentiae*

in honor of Mrs. C. S. Sargent. These lilies were collected and sent supposing them to be *Lilium leucanthemum*, but when compared with typical specimens they proved to be quite distinct both in bulb and flower, although evidently they can only be considered as distinct types or varieties of it.

Lilium leucanthemum, as collected by Dr. Henry, has a pure white corolla with green midribs, narrow foliage, and white bulbs, while the corolla in *Sargentiae* is purple on the outside and white on the inside. The bulbs also are purple. It is much more vigorous in every way, throwing up stout flower stems with broad leaves, and attaining a height of three to four feet, often bearing as many as twenty flowers to a stem, but averaging about twelve.

The plantation consisted of about ten thousand bulbs, all collected in China, and were planted in their present position October 1, 1911.

As collected this lily varies greatly both in stem and foliage, as well as in the color of the flowers, which ranges from nearly pure white to rosy purple and yellow. Several very distinct types may be selected, which considered in a horticultural sense will have all the value of distinct species. Among them is one with short tube and large corolla with exceedingly broad segments, greenish on the outside and white inside. It is proposed to call this type the *Farquhari*.

These are loam-loving lilies and their hardiness, productiveness, and adaptability for general cultivation are evident when it is considered that the original stock, although it has been in this country but four years, has so multiplied that the bulbs may be counted by the hundred thousand, in all sizes from the smallest seedlings to the mature bulbs.

Near these lilies was an equally large plantation of the superb *L. myriophyllum*, another of Mr. Wilson's introductions from western China. Although their flowering season had passed the plants were in vigorous health and were growing under the same conditions as the others, which were planted in clayey loam on a bleak hillside sloping toward the east.

The members of the committee were favorably impressed with *Lilium Sargentiae* and believe it to be a lily that when planted in

ordinary gardens the same measure of success may be expected as one would look for when planting the old *Lilium tigrinum.*

After visiting the lilies the party was shown through the nursery in which large numbers of the various species of plants collected by Mr. Wilson are being tested. As the time was limited only a casual glance could be given these, but among them three plants were noticed which have been sufficiently tested to prove their value. These were *Ligustrum Prattii, Cotoneaster horizontalis,* a fine wall plant, and *Berberis verruculosa,* a perfectly hardy little barberry with foliage bronzy green above and silvery beneath. As this latter plant never makes a large shrub it will become very useful in many ways in landscape planting.

B. Hammond Tracy's Gladiolus Farm at Wenham.

August 15 the committee inspected the gladiolus plantations of B. Hammond Tracy at Wenham, Massachusetts. The great development of commercial horticulture in recent years is strikingly illustrated here and to Mr. Tracy is due much of the credit of bringing the gladiolus to the front rank of popular flowers.

Mr. Tracy's estate, which is called Cedar Acres, comprises an area of twenty-seven acres, twenty of which are devoted to the cultivation of gladioli on a commercial scale. In the height of the season ten thousand spikes are cut daily and shipped to the florists of Boston, New York, and even as far as Chicago.

Of the thousand or more of named varieties grown here the various shades of pink are in most demand and in this class the variety Dawn is one of the handsomest. He has also large plantings of seedlings among which he expects to produce some desirable and valuable varieties.

In his cultivation Mr. Tracy uses a ton of lime to the acre, and also, when the plants are in bud, a liberal dressing of bone meal, nitrate of soda, and sulphate of potash, in about equal parts. The general character of the farm is gravelly but it is heavily fertilized in the spring with barnyard dressing of which cow manure forms a principal part.

The committee also looked through the storage house which has long rows of shelving for the proper keeping of the bulbs. It has a capacity of five thousand bushels and of this immense quantity the greater part is sold out annually.

Roads are laid out through the farm making it convenient to inspect at close range and in the summer sunshine the masses of brilliant color produce a wonderfully beautiful effect.

Awards made by the Committee on Gardens.

Society's Prizes.

For a garden of spring-flowering plants, not commercial:
First, Bayard Thayer, South Lancaster — Silver Medal
For a garden of summer or fall-flowering plants, not commercial:
First, Mrs. Charles W. Parker, Marblehead — Silver Medal
Second, Col. Harry E. Converse, Marion — Bronze Medal
For a garden or collection of peonies, not commercial:
First, Wilton Lockwood, South Orleans — Silver Medal
For a garden or collection of hardy roses, not commercial:
First, Col. Harry E. Converse, Marion — Silver Medal
Second, Wilton Lockwood, South Orleans — Bronze Medal
For a rock garden:
First, Mrs. Charles W. Parker, Marblehead — Silver Medal
For a garden of large or small fruits:
First, Col. Harry E. Converse, Marion — Silver Medal
Second, Charles W. Parker, Marblehead — Bronze Medal
For a vegetable garden, not commercial:
First, Col. Harry E. Converse, Marion — Silver Medal

Special Awards.

American Forestry Co., South Framingham, for nurseries of forest trees, Silver Medal.

Andrew Gray Weeks, Marion, for effective planting of estate, Silver Medal.

Charles S. Eaton, Marblehead, for fine condition of estate, Silver Medal.

R. &. J. Farquhar & Co. Roslindale, for collection of newly introduced Chinese lilies, Honorable Mention.

B. Hammond Tracy, Wenham, for gladiolus gardens, Honorable Mention.

CHARLES W. PARKER
JACKSON T. DAWSON
ARTHUR H. FEWKES
THOMAS J. GREY
T. D. HATFIELD
WILLIAM NICHOLSON
DAVID F. ROY
WILLIAM P. RICH
CHARLES SANDER
WILLIAM THATCHER
WILFRID WHEELER

Committee on Gardens.

REPORT OF THE COMMITTEE ON CHILDREN'S GARDENS.

By Henry Saxton Adams, Chairman.

The work of the Committee on Children's Gardens has for a number of years been confined entirely to the Exhibition which is held on the Saturday and Sunday before Labor Day. The exhibition this year was a marked improvement over any previous year both in quality and quantity of exhibits and indicates the growing interest among the children in garden work throughout the State.

The schedule, issued early in the year, was made up to meet the Society's appropriation. Shortly after its distribution an act (Chapt. 260) was passed by the Legislature granting a bounty of $200.00 to Agricultural Societies "to be distributed to children and youths under 18 years of age for animals, farm crops, fruits and vegetables grown by the exhibitor and for excellence in stock judging." This enabled us to add nine new classes making in all 76 prizes in 19 classes. There were 70 different children entered for prizes of which 38 were boys and 32 girls and these children represented 17 different sections.

Your committee awaited the exhibition with some anxiety owing to the dry summer but when the children and their baskets and boxes began to arrive we realized at once that we were not going to be disappointed. The exhibition when finally set up proved to nearly fill the large Exhibition Hall, with entries in every class.

The judging was faithfully done by the various members of the committee who were divided into groups and we have yet to hear of any dissatisfaction in the awards. Your chairman wishes to express his appreciation of the faithful and careful attention given this important work. Of the 76 prizes offered 67 were given and 41 special awards made.

Your special attention is called to the list of awards accompanying this report showing as it does the wide distribution of the

exhibitors. Some of the exhibits, especially from the City gardens where conditions are most trying, were especially good and these young gardeners well deserve the awards given.

The attendance at the show was good and much interest was shown in the remarkably good exhibits. Many grown-ups admitted that they could not have done better themselves.

Special mention should be made of the excellent exhibits of native flowers, berries, leaves, and grasses. This table attracted a large amount of attention and was appreciated by all. We are hoping for an increase in these exhibits as time goes on.

We hope and expect a better show next year. The members of the Society should not forget this exhibition. It is interesting and in many ways unique and will well repay a visit.

The work of this committee is already bearing good fruit and some of our early exhibitors are now practical horticulturists. Let us give them all the encouragement possible and help them become acquainted with our Society so that they may become valued and useful members in the future.

PRIZES AND GRATUITIES AWARDED, AUGUST 31 AND SEPTEMBER 1, 1912.

For the best collection of vegetables from a school garden:

First.— Melrose Vacation School	$6 00
Second.— South End Industrial School, Roxbury	5 00
Third.— Waltham School Garden	4 00
Fourth.— Lancaster School Garden	3 00
Fifth.— Church Home Garden, South Boston	2 00
Sixth.— Quincy School Garden	1 00

Special Award.

Winning Farm Garden Club, South End House, Boston	1 00

For the best collection of vegetables from a school garden established since 1909:

First.— Groton School Garden	5 00
Second.— Sterling Street Garden, Roxbury	4 00
Third.— Cambridge Neighborhood House	3 00

For the best collection of flowers from a school garden:

First.— South End Industrial School, Roxbury	6 00
Second.— South Bay Union Garden Club, Boston	5 00
Third.— Church Home Garden, South Boston	4 00
Fourth.— Quincy School Garden	3 00
Fifth.— North Lancaster School Garden	2 00
Sixth.— South Lancaster School Garden	1 00

Special Award.

Lancaster School Garden	1 00

For the best collection of flowers from a school garden established since 1909:

First.— Sterling Street Garden, Roxbury	5 00
Second.— Groton School Garden	4 00
Third.— Cambridge Neighborhood House	3 00

For the best collection of vegetables from a child's home garden:

First.— Louis E. Hain, Roslindale	5 00
Second.— James Zavattono, Quincy	4 00
Third.— Robert Fisher, Waltham	3 00
Fourth.— Harry Lawrence, West Groton	2 00
Fifth.— Hermine Schulz, Roslindale	1 00

Special Awards.

Prescott N. Arnold, Milton	1 00
Laurence Lewis, Groton	1 00
Stanhope Ring, Quincy	1 00
Joseph K. Barber, Jr., Wollaston	1 00
Walter Vaughan, Waltham	1 00
Edward Heintz, Waltham	1 00
Karl Swett, Waltham	1 00
Joseph Loughlin, Waltham	1 00
Waldo Harvey, Waltham	1 50

For the best collection of flowers from a child's home garden:

First.— John C. Thatcher, Brookline	5 00
Second.— Freda and Mildred Hauser, Roxbury	4 00
Third.— Winslow Stratton, Marlboro	3 00
Fourth.— Evelyn Fisher, Waltham	2 00
Fifth.— Olive E. Coburn, Waltham	1 00

Special Awards.

Gladys Davis, Waltham	50
Gertrude Madden, Marlboro	50
Mary Suz, Marlboro	50
Arlene Gelinas, Marlboro	50
Ingeburg Frederickson, Waltham	50
Walter Vaughan, Waltham	50
Flora Stearns, Waltham	50
Lena Fleming, Waltham	50

For the best three vases of flowers from a child's garden:

First.— Martha Townsend, Lynn	3 00
Second.— Margaret Thatcher, Brookline	2 50
Third.— John Wentworth, Quincy	2 00
Fourth.— Gertrude McGrann, Quincy	1 50
Fifth.— Sarah Shanahan, Roxbury	1 00

For the best three potted plants grown by a child in the City of Boston:

First.— Charles Waters	3 00
Second.— Etta Annie Goldberg	2 00
Third.— John Shea	1 00

Special Awards.

Peter Neugar	50
Samuel Zigma	50
Jacob Lanes	50

For the best bouquet of flowers from a child's home garden:

First.— Martha Townsend, Lynn	3 00
Second.— John G. Thatcher, Brookline	2 50
Third.— Donald W. Rust, Jamaica Plain	2 00
Fourth.— Mary J. Whittaker, Marlboro	1 50
Fifth.— Gertrude Schulz, Roslindale	1 00

For the best collection of native flowers, berries, leaves, and grasses:

First.— Martha Townsend, Lynn	5 00
Second.— Olive E. Coburn, Waltham	4 00
Third.— Evelyn Fisher, Waltham	3 00
Fourth.— Donald W. Rust, Jamaica Plain	2 00
Fifth.— Ralph Walton Saunderson, Waltham	1 00

Special Awards.

Ruth Obrion, Jamaica Plain 1 00
William J. Clark, West Groton 1 00

For the best three vases of china asters:

First.— Margaret Thatcher, Brookline 3 00
Second.— Gladys Connell, Roxbury 2 00
Third.— Mildred I. Keyes, Marlboro 1 00

For the best three vases of dahlias:

First.— Mary J. Whittaker, Marlboro 3 00
Second.— George Porter, Marlboro 2 00

For the best six specimens of beets:

First.— Martha Kreidel, Roxbury 3 00
Second.— Aubury Porter, Marlboro 2 00
Third.— George Blood, Marlboro 1 00

Special Award.

Roy Figaered, Marlboro 50

For the best six ears of green sweet corn:

First.— Hermine Schulz, Roslindale 3 00
Second.— Charles Waters, Roxbury 2 00
Third.— Philomena Gabesso, Marlboro 1 00

Special Award.

Clarence Chute, Cambridge 50

For the best four specimens of cucumbers:

First.— Sarah Shanahan, Roxbury 3 00
Second.— Wilson Walker, Marlboro 2 00
Third.— Hermine Schulz, Roslindale 1 00

For the best plate green string beans, 50 pods:

First.— Edward Hoffman, Roxbury 3 00
Second.— Mary Gavin, Roxbury 2 00
Third.— Edward Flint, Marlboro 1 00

For the largest pumpkin or squash:

First.— Edward Flint, Marlboro 5 00

Special Award.

Ida Cameron, Roxbury . . . . . $ 50

For the best collection of four different vegetables:

First.— Robert Fisher, Waltham 5 00
Second.— Martin O'Rourke, Roxbury 3 00
Third.— Malcolm Cameron, Roxbury 2 00

Special Awards.

Walter Pobleng, Roxbury 1 00
Helen Gavin, Roxbury 1 00
Ethel Cushbaum, Roxbury 1 00
Walter Boltz, Roxbury 1 00
Gladys Connell, Roxbury 1 00
Grace Lynch, Roxbury 1 00
Elizabeth Niles, Roxbury 1 00
Charles Waters, Roxbury 1 00
Hermine Schulz, Roslindale 1 00

Additional Awards.

Irene Lincoln, Marlboro, Collection of pressed flowers 1 00
Gertrude Schulz, Roslindale, " " " " 1 00
Etta Goldberg, Boston, Window boxes 50
Mary Sharkey, Boston " " 50
Helen Healey, Boston, Two plants petunia 50

HENRY SAXTON ADAMS
JOSEPH CLARK
HARRY S. RAND
WILLIAM P. RICH
B. HAMMOND TRACY
JAMES WHEELER

Committee on Children's Gardens.

REPORT OF THE COMMITTEE ON LECTURES AND PUBLICATIONS FOR THE YEAR 1912.

By Edward B. Wilder, Chairman.

Your committee is happy to report that the lectures and discussions for the year have been a success, the attendance for the whole course amounting to over 2100 persons.

When we realize that most of these lectures are printed in the Transactions of the Society and sent to other horticultural societies, as well as individuals, throughout this country, indeed throughout the world, and are placed in libraries as textbooks for future reference, we feel that this department of the work is well worthy the support given it by the Society.

The change in the hour of the meetings, from 11 A. M. to 2 P. M., has passed the experimental stage and can be considered an established custom for the future, as being the hour best suited to our patrons. The largest attendance and greatest interest in the course were manifested in those lectures conducted by our own members, practical men, as Robert Cameron, William N. Craig, Fred A. Smith, Wilfrid Wheeler, and E. H. Wilson.

We wish it were possible to have a lecture hall at our disposal, so that our course could be held on consecutive Saturdays, without the break of weeks, caused by the renting of the present hall.

We would respectfully submit the following program of lectures and discussions for 1913:

January 4. The Problems of the Commercial Fruit Grower. By G. A. Drew, Greenwich, Conn.

January 11. Planting Fruit Trees Propagated from Strains of Known Worth. By Samuel Fraser, Geneseo, N. Y.

February 1. Factors Influencing the Formation of Fruit Buds in Apples Trees. By Prof. B. S. Pickett, Urbana, Ill.

February 8. Adaptation of Local Grown Seed to Local Conditions. By William W. Tracy, Washington.

February 15. Landscape Arrangement of Public Parks and Private Grounds. With Stereopticon Illustrations. By Arthur A. Shurtleff, Boston.

March 1. The Diseases of the Violet. By Dr. Donald Reddick, Ithaca, N. Y. (*The John Lewis Russell Lecture.*)

March 8. The Gladiolus and its Culture. By B. Hammond Tracy, Wenham.

March 15. No Lecture on this date. Spring Flower Show.

March 22. Fertilizer Problems of the Orchard and Garden. By Prof. Geo. E. Adams, Kingston, R. I.

March 29. The Making of a Country Estate. By Henry Wild, Greenwich, Conn.

EDWARD B. WILDER
ROBERT CAMERON
J. K. M. L. FARQUHAR
} *Committee on Lectures and Publications.*

REPORT OF THE DELEGATE TO THE STATE BOARD OF AGRICULTURE FOR THE YEAR 1912.

By Wilfrid Wheeler, Delegate.

The season of 1912 was a fairly successful one for the farmers of Massachusetts, and particularly so early in the season. Market garden crops were good and sold well until the fall when there was a decided drop in lettuce and other greenhouse crops.

Weather conditions were on the whole favorable with the exception of June and July when we had about five weeks of very dry weather, after which, however, conditions were more normal and crops and prices were decidedly better. While the whole season was cold, yet there were no serious frosts late in the spring, and we had a very long open fall which was conducive to the development of many crops.

The work of the Board for the past year has been along many lines. Institutes have been held as usual and with an increase of attendance, especially at the fruit and dairy institutes, the whole averaging over 118.

The Board has worked for better roads in the small towns of the state, has advocated better methods in dairying and sheep farming, and has also advocated the reclamation of wet and waste lands of which there are over 100,000 acres in the state.

A great deal of legislation was advocated, especially along dairying lines. A bill calling for the appropriation of $15,000 for the encouragement of dairying was proposed, and while this did not become a law, yet the discussion it brought out has resulted in many reforms in dairying, and it is hoped that the bill will go through this year. $2000.00 was appropriated for use by the Board in special shows, and there was also an appropriation of $2000.00 made for a special exhibit to be held in New York.

Publications.

The publications of the Board for the year have been as follow:

Six Crop Reports each with subjects of importance to Massachusetts Farmers, averaging 8000 copies.

Agricultural bulletins, #1, #2, #3.

Six Nature Leaflets reprinted.

Eleven new publications were brought out, chief among which was the special report of the State Ornithologist on Game Birds, Wild Fowl, and Shore Birds. This book contains 638 pages and an edition of 5000 copies was printed. This book is undoubtedly the best of its kind ever published, and the demand has been so great that we shall soon need a new edition.

Agriculture of Massachusetts, 1911, was also printed; 15,000 copies, 715 pages, and contains the report of the Secretary and other Massachusetts agricultural data.

Office Work.

About $72,000 was used by the Board in its expenses for the year. The office work of the Board has increased very much the past year, and we are now receiving over 80 letters a day from persons all over the country some of whom seek information in regard to Massachusetts agricultural conditions. About 50 visitors a day call at the Board rooms.

Meetings.

The usual meetings have been held as follow:

The annual meeting in January at which the business of the year was discussed. Summer field meeting at Lowell in June where several special features were introduced as a demonstration in the use of dynamite for agricultural purposes, also an exhibition of farm tools and machinery, including a traction plow.

The winter meeting in South Framingham called out a fair attendance. This meeting was one of the most interesting which the board has ever held and the list of speakers exceptionally good.

Exhibitions.

The usual fairs have been held throughout the state and most of them had good weather and successful shows. The Board also assisted the Massachusetts part of the Corn Show and together with the Massachusetts Fruit Growers' Association held a very successful fruit show in this hall in connection with the Chrysanthemum Exhibition of the Massachusetts Horticultural Society.

The Board is certainly doing good work along many lines of agricultural development, but that there is a wider field of usefulness there can be no doubt, and this field will be covered just as soon and as fast as the Board can take up these new activities and progress along all the best lines of agricultural development and this will certainly be our aim.

THE CHRYSANTHEMUM SHOW, 1912

REPORT OF THE SECRETARY AND LIBRARIAN FOR THE YEAR 1912.

In reviewing the work of the Society during the year 1912 the Secretary finds much material of interest worthy of record in this report.

In addition to the eleven regular exhibitions called for by the Schedule there was held in March a special exhibit representing an Italian garden. It was arranged with wonderful skill by the Messrs. Farquhar and was as successful from a financial point of view as it was from the horticultural. In recognition of this notable achievement of the gardener's art the Special Diploma of the Society, an award made but few times in the Society's history, was voted by the Trustees to Mr. James F. M. Farquhar who designed and arranged the exhibit.

Appreciative mention should also be made of the annual meeting and exhibition of the Sweet Pea Society of America which was held in connection with the Sweet Pea Exhibition in July and helped to make it of more than the usual interest.

In September the fifth annual exhibition of the New England Dahlia Society was held in our halls and brought out a creditable display of the popular flower in which the Dahlia Society is especially interested.

At the Chrysanthemum Show in November there was a notable exhibit of Massachusetts fruits, principally apples, which was a close rival in popular interest to the floral display. The success of this exhibition was largely due to the coöperation of the State Board of Agriculture and the Massachusetts Fruit Growers' Association.

Another noteworthy exhibition was given in the Society's building in November by the New England Corn Exposition, Inc. Its object was to encourage a more extensive growing of Indian corn and other cereals in this section of the country.

Early in the year a special committee was appointed by the Trustees to consider the matter of the proper treatment of the special trust funds of the Society. There are 23 of these funds aggregating $51,000.00. The committee reported that it would be desirable to print annually in the Schedule of Prizes and Exhibitions a brief enumeration of these various funds, mentioning the same by name, together with a statement of the purposes which the donors provided as to the application of the income from such funds. This has been carried out in the Schedule for 1912 and hereafter an itemized account will be kept showing in detail how the income of all these funds has been expended.

By this plan a greater publicity is attained and it is hoped that in calling attention to these funds and their objects the number of them may be from time to time increased.

Another important matter has been the revision of the By-laws of the Society in numerous details which the experience of the past eight years has shown to be of advantage. These amendments were all duly ratified by the Society at its annual meeting in November. By an Act of the Legislature of the State the Society has been benefited the present year by an increase in the annual appropriation for the encouragement of agriculture. The State's appropriation is now $1000.00 a year and of this amount $200.00 is to be expended in premiums to children under 18 years of age for the products of gardens carried on by them.

Through the generosity of Mr. George Robert White a further contribution of $1000.00 has been made to the fund for the award of the George Robert White Medal of Honor. The Medal for this year was voted by the Trustees to Mr. Michael Henry Walsh, the noted rose grower of Woods Hole, Massachusetts, an award which has been received with approval by horticulturists generally.

The annual course of lectures on subjects of horticultural interest was given as usual in January, February, and March. The lectures, especially those devoted to the subject of fruit growing in New England, were largely attended and attracted wide attention through their publication in the newspapers and in the Transactions of the Society.

Two corresponding members and thirty-four life and annual members have been added to the membership of the Society during

the year, and the decease of twenty-seven members has been recorded.

The publications of the Society during the year and the dates of issue are as follow:

February 21. Schedule of Prizes and Exhibitions, 60 pp.

May 4. Transactions, 1911, Part 2, pp. 79–207, Plates 1–11.

August 29. Transactions, 1912, Part 1, pp. 1–183.

The Library.

An unusually large number of accessions to the library has been made during the present year in order that the new catalogue may be made as complete as possible. Most of these additions are publications of historical value which are every year becoming difficult to obtain and more valuable owing to the increase in the number of institutions and libraries throughout the country and the consequent demand for the older publications long since out of print.

Work on the new catalogue has been steadily maintained throughout the year and is nearly completed as far as concerns the listing of the volumes, and it is expected to begin printing at an early date.

The use of the library, especially for reference and consultation by those interested in the various lines of horticulture, appears to be increasing and it is a satisfaction to feel that this great collection of books is of value to the community as an effective aid in carrying on the work of the Society.

Numerous gifts to the library have been made by interested persons during the year. Especially should be mentioned among the donors Messrs. Oakes Ames, Edward E. Norton, Howard W. Preston, Charles S. Parker, and C. Harman Payne, all of whom have presented very desirable volumes and in addition Mr. Norton has given several old manuscripts and trade catalogues of horticultural interest.

Another acceptable gift has been the presentation by Mrs. Charles P. Coffin (Grace Parkman) of Brookline of seventeen of the Society's Silver and Bronze Medals which were awarded to her father, the late Francis Parkman, during the years 1862 to 1878.

Very few of the Medals awarded in former years have ever come back to the Society and it is of especial interest that this collection will now find a permanent place in the library of the Society.

Through the courtesy of the Bureau of Plant Industry of the U. S. Department of Agriculture several lots of horticultural trade catalogues have been received which have proved desirable additions to the library's collection of this material.

William P. Rich,
Secretary and Librarian.

REPORT OF THE TREASURER FOR THE YEAR 1912.

MASSACHUSETTS HORTICULTURAL SOCIETY *in account current with* WALTER HUNNEWELL, *Treasurer, December 31, 1912.*

DR.

Paid for Library from Appropriation	$850 00	
" " " " J. W. D. French Fund	233 28	
" " " " J. S. Farlow Fund	159 06	$1,242 34
" " Heating	1,010 64	
" " Lighting	2,382 60	
" " Labor	2,057 93	
" " Stationery and Printing	1,305 32	
" " Postage	220 00	
" " Insurance	1,566 10	
" " Incidentals	1,745 29	
" " Repairs	618 74	
" " Committee on Lectures and Publications	385 50	
" " Salaries of Officers	4,404 17	
" " " Committee on Plants and Flowers	301 40	
" " " " " Fruits	153 00	
" " " " " Vegetables	138 00	
" " Committee on Prizes & Exhibitions	250 00	
" " Expenses Committee on Gardens	79 34	
" " Medals	350 67	
" " Library Catalogue	494 00	17,462 70
" " Prizes for Plants and Flowers	2,938 00	
" " Prizes for Fruits	1,089 00	
" " Prizes for Vegetables	542 00	
" " Prizes for Children's Gardens	220 00	
" " C. L. W. French Gift	10 80	
" " H. A. Gane Fund	30 00	
" " Geo. R. White Medal of Honor	234 45	
" " John C. Chaffin Fund	26 00	5,090 25
Balance December 31, 1912, Treasurer and Bursar		9,999 33
		$33,794 62

Cr.

Balance December 31, 1911			$10,745 07
Received Rents		$4,746 19	
" Exhibitions	$6,808 75		
" less expenses	3,709 13	3,099 62	
" Membership Fees		1,144 00	
" State Bounty		800 00	
" Sundry Donations		1,039 80	10,829 61
" Interest on securities from the following funds:			
S. Appleton		40 00	
J. A. Lowell		40 00	
T. Lyman		440 00	
J. Bradlee		40 00	
B. V. French		20 00	
H. H. Hunnewell		160 00	
W. J. Walker		94 16	
L. Whitcomb		20 00	
B. B. Davis		20 00	
M. P. Wilder		40 00	
J. L. Russell		40 00	
F. B. Hayes		400 00	
H. A. Gane		40 00	
J. S. Farlow		100 00	
J. D. W. French		200 00	
B. H. Pierce		32 00	
J. C. Chaffin		40 00	
B. V. French, No. 2		120 00	
G. R. White		230 00	
J. S. Farlow, Newton		116 00	
J. A. French		200 00	
		2,432 16	
" Interest and dividends on securities other than those for the above funds		9,787 78	12,219 94
			$33,794 62

Assets.

Real Estate	$518,564 63
Furniture and Exhibition Ware	10,796 96
Library	45,110 47
Plates and History	235 50
$2,000 Kansas City, Clinton, and Springfield Bonds	1,980 00
10,000 Lake Shore and Mich. So. Bonds	10,415 25
21,000 City of Newton Bonds	24,228 75
50,000 Atch. Topeka and S. F. Bonds	44,693 25
50,000 Chicago Burl. and Quincy Bonds	50,012 50
10,000 Chicago and West Mich. Bonds	9,987 50
25,000 K. C. F. S. and Memphis Bonds	27,523 75
50,000 C. B. and Q. Illinois Bonds	51,625 00
8,000 Boston and Maine Bonds	8,710 00
5,000 West End Street R'y Bonds	5,162 50
4,000 Amer. Tel. and Tel. Bonds	4,110 00
12,000 Pacific Telephone Bonds	11,670 00
200 shares General Electric Stock	12,909 90
Hayes and Loring, Trustees	2,308 66
Cash in hands of Treasurer and Bursar	9,999 33
	$850,043 95

Liabilities.

Funds invested in Bonds and Stocks:		
S. Appleton	Fund	$1,000 00
J. A. Lowell	"	1,000 00
T. Lyman	"	11,000 00
J. Bradlee	"	1,000 00
B. V. French	"	500 00
H. H. Hunnewell	"	4,000 00
W. J. Walker	"	2,354 43
L. Whitcomb	"	500 00
B. B. Davis	"	500 00
M. P. Wilder	"	1,000 00
J. L. Russell	"	1,000 00
F. B. Hayes	"	10,000 00
H. A. Gane	"	1,159 00
J. S. Farlow	"	2,500 00
J. D. W. French	"	5,000 00
B. H. Pierce	"	800 00
J. C. Chaffin	"	1,224 89

B. V. French, No. 2 Fund	$3,000 00	
J. A. French "	5,000 00	
G. R. White "	6,000 00	
J. S. Farlow, Newton "	2,900 42	$61,438 74
Surplus		788,605 21
		$850,043 95

WALTER HUNNEWELL,
Treasurer.

MEMBERSHIP OF MASSACHUSETTS HORTICULTURAL SOCIETY.

DECEMBER 31, 1912.

Life Members, December 31, 1911		682	
Added in 1912		23	
Changed from Annual		5	
		710	
Deceased		17	693
Annual Members, December 31, 1911		155	
Added in 1912		11	
		166	
Deceased	6		
Changed to Life	5		
Resigned	3		
Dropped for non-payment of assessment for 2 years	6	20	146
Membership, December 31, 1912			839

INCOME FROM MEMBERSHIP.

23 New Life members at $30	$690 00
11 New Annual Members at $10	110 00
5 Changed to Life	100 00
Assessments for 1912	244 00
	$1,144 00

WALTER HUNNEWELL,
Treasurer.

AUDITOR'S CERTIFICATE.

40 State Street, Boston,
February 5, 1913.

To the Finance Committee of the
Massachusetts Horticultural Society.

Gentlemen:

As requested by you I have made a thorough audit of the books and general accounting affairs of the Massachusetts Horticultural Society for the year which ended with the thirty-first day of December, 1912, and herewith submit to you my report of the same.

Report.

I have proved the correctness of the ledger, journal, and cash books and the small books tributary to the cash books, and saw that all balances were properly carried forward. I examined all vouchers and checks representing the disbursements during the year and found the amount of cash required by the cash book upon the first day of January, 1913, to have been on hand and also examined the securities of the Society, finding them in all details in accordance with the requirements of the records. I traced all postings from the journal and cash books into the ledger and certify that the balance sheet taken from it as of the 31st of December, 1912 is a correct abstract and that the Treasurer's statement of the assets and liabilities of the Society upon said date is true to the best of my knowledge and belief.

In short, I satisfied myself that the work in connection with the accounting affairs of the Society is being intelligently and faithfully performed and that the books and papers of the Society are in commendable condition.

Yours very respectfully,

Andrew Stewart,
Certified Public Accountant.

THE ANNUAL MEETING, NOVEMBER 16, 1912.

ANNUAL MEETING FOR THE YEAR 1912.

The Annual Meeting of the Massachusetts Horticultural Society for the year 1912 was held at Horticultural Hall, Boston, on Saturday, November 16, at twelve o'clock, noon.

President Parker occupied the chair and in calling the meeting to order stated that it had been called in accordance with the requirement of the By-laws for the election of officers for the ensuing year and for the transaction of such other business as might be legally presented; and that a printed notice of the meeting had been mailed to the address of every member of the Society as it appeared upon the records of the Secretary.

The President appointed Edward B. Wilder, J. Allen Crosby, and William P. Rich a committee to receive, assort, and count the ballots, and to report the number. He then declared the polls open, to remain until four o'clock.

The record of the previous meeting, that of January 6, 1912, was read by the Secretary and approved by vote of the meeting.

The President announced that the Board of Trustees had voted an appropriation of $6000.00, in addition to the income of the special prize funds of the Society, for prizes and gratuities for the year 1913.

On recommendation of the Board of Trustees Mr. C. Harman Payne of London was elected to corresponding membership in the Society.

A recess until four o'clock was declared by the President and Edward B. Wilder was appointed as presiding officer for the remainder of the meeting.

During the recess an informal lunch was served in the loggia, an innovation which met with the general approval of the members present and afforded an opportunity for friendly greetings.

At four o'clock Chairman Wilder declared the polls closed and Mr. Crosby, on behalf of the ballot committee, announced the result as follows:

Whole number of votes cast, 76.

For President, John K. M. L. Farquhar had 75. For Vice President, Richard M. Saltonstall had 75. For Trustees for three years, William Downs, Arthur F. Estabrook, Nathaniel T. Kidder, and Charles W. Parker each had 76. For Trustee for one year, Edward B. Wilder had 76. For Nominating Committee, Harold L. Frost had 76, Theophilus D. Hatfield, 76, Henry S. Hunnewell, 76, Herbert W. Rawson, 76, William Sim, 75.

The several amendments to the By-laws had each received the necessary two-thirds vote.

Chairman Wilder then announced the following list to be the duly elected officers of the Society for the year 1913:

President	John K. M. L. Farquhar
Vice President	Richard M. Saltonstall
(for two years),	
Trustees	William Downs
(for three years)	Arthur F. Estabrook
	Nathaniel T. Kidder
	Charles W. Parker
Trustee	Edward B. Wilder
(for one year)	
Nominating Committee	Harold L. Frost
	Theophilus D. Hatfield
	Henry S. Hunnewell
	Herbert W. Rawson
	William Sim

He announced also that all the proposed amendments to the By-laws, contained on the ballot, had received the necessary two-thirds vote and were adopted.

The meeting was then dissolved.

William P. Rich,
Secretary.

THE YELLOW MRS. JEROME JONES CHRYSANTHEMUM EXHIBITED BY JAMES NICOL, NOVEMBER, 1912

NECROLOGY, 1912.

NECROLOGY, 1912.

Levi L. Willcutt, a former prominent business man of Boston, died at his home in Brookline, Massachusetts, January 3, 1912, in his 86th year. He had been a member of the Society since 1865.

Francis Jackson Ward of Roxbury, Massachusetts, a member of the Society since 1889, died January 14, 1912, at the age of 82.

Mrs. Josephine L. Richards of West Medford, Massachusetts, died at her home there January 23, 1912, at the age of 84. She became a member of the Society in 1887. Mrs. Richards will be well remembered as an exhibitor of native plants at the Saturday exhibitions of the Society during the years from 1880 to 1900. Her collections attracted wide attention and were the means of interesting many people in the study of the native flora of the state.

Captain Frank L. Oakes of Newton, Massachusetts, a member of the Society since 1902, died January 31, 1912. Captain Oakes was born in Yarmouth, Maine, and was for a long period commander of many ships engaged in foreign voyages.

John Gordon Wright of Brookline, Massachusetts, a member of the Society since 1897, died at his home in that town January 31, 1912, in his 70th year. Mr. Wright was especially interested in rose culture and was a frequent exhibitor of roses at the exhibitions of the Society.

Joseph Story Fay, Jr. of Boston died at his home in that city February 4, 1912, at the age of 65. He was elected a member of the Society in 1899.

George Maw of Surrey, England, a corresponding member of the Society since 1887, died February 7, 1912, at the age of 79. He was eminent as a botanist and horticulturist and was the author of a monograph on the genus Crocus.

Edward Livingston Davis died at his home in Worcester, Massachusetts, March 2, 1912, in his 78th year. He became a member of the Society in 1899.

Albert L. Murdock, who died March 8, 1912, was born in Boston, September 4, 1829. He was elected to membership in the Society in 1901.

Henry Brooks of Concord, Massachusetts, a member of the Society since 1900, died March 16, 1912.

George A. Hall of Chelsea, Massachusetts, died in that city March 26, 1912, at the age of 83. He had been connected with the Society since 1864.

Aaron Low, formerly of Hingham, Massachusetts, died at his home in Essex, April 1, 1912, in his 79th year. Mr. Low was engaged in the seed business for many years and was a frequent exhibitor of vegetables and fruits at the exhibitions of the Society. From 1896 to 1904 he served continuously as a member of the Committee on Vegetables and was also chairman of the Committee on Lectures and Publications from 1898 to 1904. He lectured before the Society at different times on subjects connected with vegetable culture and took an active part for many years in the meetings held for the discussion of horticultural matters.

He was a veteran of the Civil War and had also served in the Legislature of the state. He became a member of the Society in 1887.

Thomas Jefferson Coolidge, Jr., a member of the Society since 1899, died at his summer home in Manchester, Massachusetts, April 14, 1912, at the age of 49. Mr. Coolidge was born in Boston, March 16, 1863. He was prominently identified with many of the financial and educational institutions of the city.

Lawrence Tucker of Boston, died at his home in that city May 16, 1912, in his 68th year. He became a member of the Society in 1900.

R. William E. Vining died at his home in Hingham, Massachusetts, May 22, 1912. Mr. Vining was born in South Weymouth,

March 1, 1874. He carried on the florist's business in Hingham for many years and many a thrifty hedge in that town bears witness to his horticultural skill. He started in business with very small means, bought land and built two greenhouses, and each year found him more successful than the preceding.

He was a great advocate of cement used in all its various forms, until, at last, in 1909 he built for himself a beautiful cement dwelling house, one of the handsomest in Hingham. He was admitted a member of the Society in 1904.

By Mrs. Lois Vining Walker.

Elijah A. Wood of Newton, Massachusetts, a member of the Society since 1891, died in Chicago June 1, 1912. Mr. Wood was born in Newton April 22, 1859. He came from a family deeply interested in horticulture; his father, the late E. W. Wood, his mother, and his two brothers, all were prominently identified with the Society, and well known in horticultural circles in the vicinity of Boston.

Thomas Doliber of Brookline, Massachusetts, died June 5, 1912, in his 76th year. Mr. Doliber was much interested in the culture of the chrysanthemum and was a frequent exhibitor of the products of his greenhouses at the exhibitions of the Society of which he had been a member since 1895.

John Allgood Pettigrew of Jamaica Plain, Massachusetts, a member of the Society since 1898, died July 2, 1912. Mr. Pettigrew was born in England April 25, 1844, and came to this country in 1865, engaging in horticultural work, first in Chicago, and afterwards in Milwaukee and Brooklyn. In 1897 he came to Boston as Superintendent of Parks, holding that position at the time of his death.

Mr. Pettigrew was actively interested in the affairs of the Society, serving as a member of several committees and as a Trustee from 1904 to the present year. He was an eminent authority on all matters relating to horticulture and landscape gardening, and his work in connection with the Boston Parks, especially, placed him at the head of the park superintendents of the country.

Amory Appleton Lawrence of Boston, a member of the Society since 1895, died July 6, 1912. He was born in Boston, April 22, 1848, and a graduate of Harvard in the class of 1870. He was identified with many business interests of the city and a patron of numerous educational and philanthropic institutions.

William R. Smith of Washington, D. C., died in that city July 7, 1912. For nearly sixty years he was the superintendent of the United States Botanic Garden at Washington. He was elected to corresponding membership in the Society in 1891.

Professor John Craig, of Ithaca, New York, a corresponding member of the Society since 1911, died August 12, 1912. He was connected with the Agricultural College of Cornell University and was well known throughout the country as an expert in pomology.

Edmund M. Wheelwright, a prominent architect of Boston, died August 14, 1912, at the age of 58. Mr. Wheelwright was the designer of many public buildings in Boston and other cities including the new building of the Society constructed in 1900. He became a member of the Society in 1899.

John Livingston Grandin of Boston died September 10, 1912, at the age of 76. He was elected to membership in the Society in 1905.

Miss Louise Howe of Brookline, Massachusetts, a member of the Society since 1906, died at her home in Brookline, September 13, 1912.

Doctor Arthur Tracy Cabot, a prominent surgeon of Boston, died at his home in that city November 4, 1912, in his 60th year. He joined the Society in 1899.

Henry Bigelow Williams of Boston died November 14, 1912, in his 69th year. He became a member of the Society in 1901.

James Goldthwaite Freeman of Weston, Massachusetts, died December 3, 1912, at the age of 64. He became connected with the Society in 1910.

OFFICERS, COMMITTEES, AND MEMBERS, 1912.

Massachusetts Horticultural Society.

OFFICERS AND STANDING COMMITTEES FOR 1912.

President.

CHARLES W. PARKER, of Boston.

Vice-Presidents.

WALTER HUNNEWELL, of Boston.
JOHN K. M. L. FARQUHAR, of Boston.

Treasurer.

WALTER HUNNEWELL, of Boston.

Secretary.

WILLIAM P. RICH, of Chelsea.*

Trustees.

THOMAS ALLEN, of Boston.
WILLIAM N. CRAIG, of North Easton.
ERNEST B. DANE, of Brookline.
ARTHUR F. ESTABROOK, of Boston.
HARRY F. HALL of Waban.
NATHANIEL T. KIDDER, of Milton.
JOHN A. PETTIGREW, of Boston.
THOMAS ROLAND, of Nahant.
RICHARD M. SALTONSTALL, of Brookline.
CHARLES S. SARGENT, of Brookline.
STEPHEN M. WELD, of Wareham.
WILFRID WHEELER, of Concord.

Nominating Committee.

ROBERT CAMERON, of Cambridge.
DR. WALTER G. KENDALL, of Atlantic.
KENNETH FINLAYSON, of Jamaica Plain.
C. MINOT WELD, of Milton.
FRANK WHEELER, of Concord.

* Communications to the Secretary, on the business of the Society, should be addressed to him at Horticultural Hall, Boston.

COMMITTEES FOR 1912.

Finance Committee.

WALTER HUNNEWELL, *Chairman.*
ARTHUR F. ESTABROOK, STEPHEN M. WELD.

Committee on Prizes and Exhibitions.

JOHN A. PETTIGREW, *Chairman.*

ROBERT CAMERON, WILLIAM DOWNS, J. K. M. L. FARQUHAR,
M. A. PATTEN, WILFRID WHEELER.

Committee on Plants and Flowers.

T. D. HATFIELD, *Chairman.*
ARTHUR H. FEWKES, WILLIAM NICHOLSON, THOMAS ROLAND,
WILLIAM C. RUST, WILLIAM SIM.

Committee on Fruits.

EDWARD B. WILDER, *Chairman.*
WILLIAM DOWNS, WILFRID WHEELER.

Committee on Vegetables.

DUNCAN FINLAYSON, *Chairman.*
WILLIAM N. CRAIG, EDWARD PARKER.

Committee on Gardens.

CHARLES W. PARKER, *Chairman.*
JACKSON T. DAWSON, ARTHUR H. FEWKES, THOMAS J. GREY,
T. D. HATFIELD, WILLIAM NICHOLSON, WILLIAM P. RICH,
DAVID F. ROY, CHARLES SANDER,
WILLIAM THATCHER, WILFRID WHEELER.

Committee on Library.

CHARLES S. SARGENT, *Chairman.*
ERNEST B. DANE, GEORGE B. DORR, CHARLES S. MINOT.

Committee on Lectures and Publications.

EDWARD B. WILDER, *Chairman.*
ROBERT CAMERON, J. K. M. L. FARQUHAR.

Committee on Children's Gardens.

HENRY S. ADAMS, *Chairman.*
JOSEPH CLARK, HARRY S. RAND, WM. P. RICH,
B. HAMMOND TRACY, JAMES WHEELER.

MEMBERS OF THE MASSACHUSETTS HORTICULTURAL SOCIETY, 1912.

Revised to December 31, 1912.

HONORARY MEMBERS.

Members and correspondents of the Society and all other persons who may know of deaths, changes of residence, or other circumstances showing that the following lists are inaccurate in any particular, will confer a favor by promptly communicating to the Secretary the needed corrections.

1900 Sir Trevor Lawrence, President of the Royal Horticultural Society, London.
1900 Dr. Henry S. Pritchett, Washington, D. C.
1900 Albert Viger, President of the National Society of Horticulture of France, Paris.
1897 Hon. James Wilson, Secretary of Agriculture, Washington, D. C.

CORRESPONDING MEMBERS.

1901 George Francis Atkinson, Professor of Botany in Cornell University, Ithaca, N. Y.
1889 Professor L. H. Bailey, Director of College of Agriculture, Cornell University, Ithaca, N. Y.
1898 John Gilbert Baker, F. R. S., F. L. S., Kew, England.
1875 Professor William J. Beal, Amherst, Mass.
1911 W. J. Bean, Royal Gardens, Kew, England.
1889 Charles E. Bessey, Ph.D., Professor of Botany in the Industrial College of the University of Nebraska, Lincoln.
1900 Col. Gustavus B. Brackett, Pomologist of the United States Department of Agriculture, Washington, D. C.

1911 John Dunbar, Park Department, Rochester, N. Y.
1887 Sir W. T. Thiselton Dyer, K. C. M. G., F. R. S., "Witcombe," Gloucester, England.
1875 Parker Earle, President of the American Horticultural Society, Roswell, N. M.
1887 H. J. Elwes, F. R. S., Colesborne, Cheltenham, England.
1889 William G. Farlow, M. D., Professor of Cryptogamic Botany, Harvard University, Cambridge.
1893 B. E. Fernow, University of Toronto, Toronto, Ontario.
1900 Beverly T. Galloway, Horticulturist and Superintendent of Gardens and Grounds of the United States Department of Agriculture, Washington, D. C.
1877 George L. Goodale, M. D., Cambridge.
1895 Professor Byron D. Halsted, Botanist and Horticulturist at the New Jersey Agricultural Experiment Station, New Brunswick, N. J.
1911 Professor U. P. Hedrick, New York Agricultural Experiment Station, Geneva, N. Y.
1907 Dr. Augustine Henry, Cambridge, England.
1897 J. W. Hoffmann, Colored State University, Orangeburg, S. C.
1906 Senor Don Salvador Izquierdo, Santiago, Chile.
1889 Professor William R. Lazenby, Department of Horticulture and Forestry; Secretary College of Agriculture and Domestic Science, Ohio State University, Columbus, O.
1911 Émile Lemoine, Nancy, France.
1875 T. C. Maxwell, Geneva, N. Y.
1911 J. Ewing Mears, M. D., Philadelphia, Pa.
1911 Wilhelm Miller, Editor of Country Life in America, Garden City, N. Y.
1898 Sir Frederick W. Moore, Curator of the Royal Botanic Gardens, Glasnevin, Dublin, Ireland.
1887 Sir Daniel Morris, C. M. G., D.Sc., M. A., F. L. S.
1909 T. V. Munson, Denison, Texas.
1898 Peter Nφvik, Secretary of the Norwegian Horticultural Society, Christiania.
1912 C. Harman Payne, London, England.
1906 Lieut. Col. David Prain, Director of the Royal Botanic Gardens, Kew, England.
1894 Cavalière Enrico Ragusa, Palermo, Sicily.
1906 Dr. Henry L. Ridley, Director of the Botanic Garden, Singapore.
1898 Benjamin Lincoln Robinson, Ph.D., Curator of the Gray Herbarium of Harvard University, Cambridge.
1875 William Robinson, Editor of Gardening Illustrated, London.
1899 William Salway, Superintendent of Spring Grove Cemetery, Cincinnati, O.
1875 Robert W. Starr, Wolfville, N. S.

1893 William Trelease, St. Louis, Mo.
1882 H. J. Veitch, Chelsea, England.
1905 Maurice L. deVilmorin, Paris, France.
1905 Philippe L. de Vilmorin, Paris, France.
1912 Professor Hugo de Vries, University of Amsterdam, Amsterdam, Holland.
1894 William Watson, Curator of Royal Botanic Gardens, Kew, England.
1906 Miss E. Willmott, Essex, England.
1911 E. H. Wilson, Jamaica Plain, Mass.
1901 Professor L. Wittmack, Secretary of the Royal Prussian Horticultural Society, Berlin, Prussia.

LIFE MEMBERS.

1899 Adams, Mrs. Charles Francis, South Lincoln.
1907 Adams, George E., Kingston, R. I.
1897 Adams, Henry Saxton, Jamaica Plain.
1899 Agassiz, Mrs. George R., Yarmouth Port.
1894 Allen, Hon. Charles H., Lowell.
1898 Allen, Thomas, Boston.
1899 Ames, F. Lothrop, North Easton.
1899 Ames, John S., North Easton.
1899 Ames, Miss Mary S., North Easton
1894 Ames, Oakes, North Easton.
1899 Ames, Oliver, North Easton.
1900 Ames, Mrs. Oliver, Sr., North Easton.
1900 Ames, Miss Susan E., North Easton.
1899 Amory, C. W., Boston.
1867 Amory, Frederic, Boston.
1899 Anderson, Larz, Brookline.
1911 Anderson, William, South Lancaster.
1864 Andrews, Charles L., Milton.
1871 Appleton, Hon. Francis H., Boston.
1900 Arnold, Mrs. George Francis, Brookline.
1894 Ash, John, Pomfret Centre, Conn.
1890 Atkins, Edwin F., Belmont.
1899 Ayer, James B., Boston.

1912 Bache, James S., Sharon, Conn.
1905 Backer, Clarence A., Melrose.
1905 Badger, Walter I., Cambridge.
1894 Bailey, Jason S., West Roxbury.
1902 Bailey, Robert M., Dedham.
1902 Baker, Clifton P., Dedham.
1901 Baker, James E., South Lincoln.
1904 Balch, Joseph, Dedham.
1909 Baldwin, Frank F., Hopkinton.
1868 Banfield, Francis L., M. D., Worcester.
1888 Barber, J. Wesley, Newton.
1904 Barker, George, Swampscott.
1905 Barnard, George E., Ipswich.
1866 Barnes, Walter S., Boston.
1904 Barney, Arthur F., Dorchester.
1867 Barney, Levi C., Boston.
1897 Barry, John Marshall, Boston.
1893 Barry, William C., Rochester, N. Y.
1899 Bartlett, Francis, Beverly.
1901 Bartlett, Miss Mary F., Boston.
1901 Bates, Miss Mary D., Ipswich.
1899 Baylies, Walter C., Taunton.
1905 Beal, Thomas P., Boston.
1891 Becker, Frederick C., Cambridge.
1876 Beckford, Daniel R., Jr., Dedham.
1894 Beebe, E. Pierson, Boston.
1890 Beebe, Franklin H., Boston.
1894 Beebe, J. Arthur, Boston.
1905 Bemis, Frank B., Beverly.
1899 Bigelow, Albert S., Cohasset.
1899 Bigelow, Joseph S., Cohasset.
1899 Bigelow, Dr. William Sturgis, Boston.
1899 Black, George N., Manchester.

1885 Blake, Mrs. Arthur W., Brookline.
1897 Blake, Edward D., Boston.
1893 Blake, Francis, Weston.
1908 Blood, Eldredge H., Cambridge.
1905 Boardman, Miss Eliza D., Boston.
1894 Boardman, Samuel M., Hyde Park.
1899 Boardman, T. Dennie, Manchester.
1875 Bolles, William P., M. D., Roxbury.
1894 Bosler, Frank C., Carlisle, Penn.
1887 Bowditch, Charles P., Jamaica Plain.
1897 Bowditch, Ernest W., Milton.
1883 Bowditch, James H., Brookline.
1894 Bowditch, Nathaniel I., Framingham.
1877 Bowditch, William E., Roxbury
1878 Bowker, William H., Boston.
1912 Bradley, Charles H., Boston.
1900 Breck, Joseph Francis, Waban.
1899 Bremer, Mrs. John L., Manchester.
1871 Bresee, Albert, Hubbardton, Vt.
1905 Brewster, William, Cambridge.
1910 Briggs, Mrs. George R., Plymouth.
1897 Briggs, William S., Lincoln.
1873 Brigham, William T., Honolulu, Hawaii.
1909 Brooke, Edmund G., Jr., Providence, R. I.
1889 Brooks, J. Henry, Milton.
1899 Brooks, Peter C., Boston.
1899 Brooks, Shepherd, Boston.
1912 Brooks, Walter D., Milton.
1909 Brown, Mrs. John Carter, Providence, R. I.
1899 Brown, Samuel N., Boston.
1907 Brush, Charles N., Brookline.
1906 Buitta, Vincent, Newton Upper Falls.
1897 Burlen, William H., Boston.
1895 Burnett, Harry, Southborough.
1911 Burnett, John T., Southborough.
1911 Burpee, W. Atlee, Philadelphia, Pa.
1909 Burr, I. Tucker, Milton.
1906 Burrage, Albert C., Boston.
1868 Butler, Aaron, Wakefield.
1907 Butterworth, George William, South Framingham.
1906 Butterworth, J. Thomas, South Framingham.
1905 Buttrick, Stedman, Concord.

1902 Cabot, George E., Boston.
1870 Calder, Augustus P., Mattapan.
1896 Cameron, Robert, Cambridge.
1908 Campbell, Charles A., Ipswich.
1891 Campbell, Francis, Cambridge.
1891 Carr, Hon. John, Roxbury.
1905 Carr, Samuel, Boston.
1893 Carter, Charles N., Needham.
1867 Carter, Miss Maria E., Woburn.
1885 Cartwright, George, Dedham.
1899 Casas, W. B. de las, Malden.
1911 Case, Miss Marian Roby, Weston.
1873 Chamberlain, Chauncy W., Boston.
1909 Chamberlain, Montague, Groton.
1903 Chapman, John L., Prides Crossing.
1909 Chase, Philip Putnam, Milton.
1895 Cheney, Mrs. Elizabeth S., Wellesley.
1894 Christie, William, Everett.
1876 Clapp, Edward B., Dorchester.
1876 Clapp, James H., Dorchester.
1871 Clapp, William C., Dorchester.
1896 Clark, B. Preston, Cohasset.
1896 Clark, Miss Eleanor J., Pomfret Centre, Conn.
1907 Clark, Herbert A., Belmont.
1890 Clark, J. Warren, Millis.
1910 Clark, Winslow, Milton.

1871 Clarke, Miss Cora H., Boston.
1899 Clarke, Eliot C., Boston.
1895 Clough, Micajah Pratt, Lynn.
1894 Cobb, John C., Milton.
1874 Coburn, Isaac E., Everett.
1906 Codman, Miss Catherine A., Westwood.
1871 Codman, James M., Brookline.
1901 Coe, Miss Mary Alma, Boston.
1903 Cogswell, Edward R., Jr., Newton Highlands.
1900 Cole, Edward E., Boston.
1887 Collamore, Miss Helen, Boston.
1900 Colton, Samuel H., Worcester.
1902 Comley, Norris F., Lexington.
1899 Converse, Col. H. E., Marion.
1902 Coolidge, Harold J., Boston.
1899 Coolidge, J. Randolph, Chestnut Hill.
1899 Coolidge, Mrs. J. Randolph, Chestnut Hill.
1892 Cottle, Henry C., Boston.
1892 Cox, Thomas A., Dorchester.
1910 Craig, David R., Boston.
1901 Craig, William Nicol, North Easton.
1899 Crane, Zenas, Dalton.
1891 Crawford, Dr. Sarah M., Roxbury.
1899 Crocker, Hon. George G., Boston.
1891 Crocker, Miss Sarah H., Boston.
1887 Crosby, George E., West Medford.
1901 Cross, Alfred Richard, Nantasket.
1909 Cumner, Mrs. Nellie B., Brookline.
1856 Curtis, Charles F., Jamaica Plain.
1899 Curtis, Charles P., Boston.
1895 Cushing, Livingston, Weston.
1906 Cutler, Mrs. Charles F., Boston.
1903 Cutler, Judge Samuel R., Revere.
1897 Damon, Frederick W., Arlington.
1908 Dane, Ernest B., Brookline.
1908 Dane, Mrs. Ernest B., Brookline.
1899 Daniels, Dr. Edwin A., Boston.
1909 Danielson, Mrs. J. DeForest, Boston.
1892 Davenport, Albert M., Watertown.
1902 Davis, Arthur E., Dover.
1902 Davis, Mrs. Arthur E., Dover.
1899 Davis, L. Shannon, Brookline.
1909 Dawson, Henry Sargent, Jamaica Plain.
1872 Dawson, Jackson T., Jamaica Plain.
1905 Day, Frank A., Newton.
1905 Day, Henry B., West Newton.
1873 Denny, Clarence H., Boston.
1904 Dexter, Gordon, Beverly Farms.
1904 Dexter, Philip, Beverly.
1866 Dike, Charles C., Stoneham.
1902 Doane, Edgar Howard, Wenham.
1896 Donald, William, Cold Spring Harbor, N. Y.
1900 Donaldson, James, Roxbury.
1907 Doten, Scott T., Jamaica Plain.
1910 Downs, William, Chestnut Hill.
1893 Dowse, William B. H., West Newton.
1894 Draper, Hon. Eben S., Hopedale.
1899 Draper, George A., Hopedale.
1896 Dreer, William F., Philadelphia, Pa.
1897 Dumaresq, Herbert, Chestnut Hill.
1899 Duncan, James L., New York, N. Y.
1902 Duncan, John W., Spokane, Wash.
1896 Dunlap, James H., Nashua, N. H.

1909 Dupuy, Louis, Whitestone. L. I., N. Y.
1852 Durfee, George B., Fall River.
1880 Dutcher, Frank J., Hopedale.
1900 Dwight, Theodore F., Kendal Green.
1902 Dyer, Herbert H., Arlington.

1912 Eaton, Harris D., Southborough.
1870 Eaton, Horace, Cambridge.
1911 Edgar, Mrs. Rose H., Waverley.
1912 Edgar, William Percival, Jamaica Plain.
1895 Eldredge, H. Fisher, Boston.
1887 Elliott, Mrs. John W., Boston.
1888 Elliott, William H., Brighton.
1903 Ellsworth, J. Lewis, Worcester.
1907 Emerson, Nathaniel W., M.D., Boston.
1898 Endicott, William, Boston.
1894 Endicott, William, Jr., Boston.
1899 Endicott, William C., Danvers.
1897 Estabrook, Arthur F., Boston.
1905 Estabrook, Mrs. Arthur F., Boston.
1907 Eustis, Miss Elizabeth M., Brookline.
1907 Eustis, Miss Mary St. Barbe, Brookline.

1881 Fairchild, Charles, New York, N. Y.
1877 Falconer, William, Pittsburg, Pa.
1884 Farlow, Lewis H., Pasadena, Cal.
1896 Farnsworth, Mrs. William, Dedham.
1890 Farquhar, James F. M., Roslindale.
1891 Farquhar, John K. M. L., Roxbury.
1884 Farquhar, Robert, North Cambridge.
1873 Faxon, John, Quincy.
1899 Fay, H. H., Woods Hole.
1908 Fay, Wilton B., West Medford.
1899 Fessenden, George B., Allston.
1883 Fewkes, Arthur H., Newton Highlands.
1904 Finlayson, Duncan, Jamaica Plain.
1892 Finlayson, Kenneth, Jamaica Plain.
1901 Fisher, Peter, Ellis.
1910 Flanagan, Joseph F., Newton.
1882 Fletcher, George V., Belmont.
1883 Fletcher, J. Henry, Belmont.
1909 Forbes, Charles Stewart, Boston.
1909 Forbes, Mrs. J. Malcolm, Milton.
1909 Forbes, Mrs. William H., Milton.
1899 Foster, Charles H. W., Needham.
1883 Foster, Francis C., Cambridge.
1885 Fottler, John, Jr., Dorchester.
1881 Fowle, George W., Jamaica Plain.
1911 Freeman, Mrs. James G., Boston.
1910 French, Mrs. Albert M., Reading.
1899 French, Miss Caroline L. W., Boston.
1892 French, S. Waldo, Newtonville.
1893 French, W. Clifford, Brookline.
1882 Frohock, Roscoe R., Boston.
1903 Frost, Harold L., Arlington.
1900 Frost, Irving B., Belmont.

1910 Galloupe, Frederic R., Lexington.
1901 Gardner, Mrs. Augustus P., Hamilton.
1895 Gardner, George A., Boston.
1895 Gardner, George P., Boston.
1899 Gardner, John L., Boston.

1899 Gardner, Mrs. John L., Brookline.
1899 Gardner, William Amory, Groton.
1904 Garratt, Allan V., Holliston.
1899 Gaston, William A., Boston.
1911 Gavin, Frank D., Manchester.
1910 Geiger, Albert Jr., Brookline.
1911 Gill, Miss Adeline Bradbury, Medford.
1911 Gill, Miss Eliza M., Medford.
1865 Gill, Mrs. E. M., Medford.
1887 Gill, George B., Medford.
1865 Gillard, William, Dorchester.
1870 Gilson, F. Howard, Wellesley Hills.
1890 Goddard, Joseph, Sharon.
1907 Goddard, Samuel J., Framingham.
1904 Goodale, Dr. Joseph L., Boston.
1885 Goodell, L. W., Dwight.
1892 Gowing, Mrs. Clara E., Kendal Green.
1899 Gray, Mrs. John C., Boston.
1910 Green, Mrs. Francis Cushing, Buzzards Bay.
1905 Greenough, Mrs. Charles P., Brookline.
1912 Greenough, Mrs. David S., Jamaica Plain.
1899 Grew, Edward S., Boston.

1897 Hale, James O., Byfield.
1873 Hall, Edwin A., Cambridgeport.
1912 Hall, Mrs. George G., Boston.
1899 Hall, Jackson E., Foxboro.
1897 Hall, Osborn B., Malden.
1910 Halloran, Edward J., Roxbury.
1863 Harding, George W., Arlington.
1869 Harding, Louis B., Chestnut Hill.
1871 Hardy, F. D., Cambridgeport.
1905 Hardy, Miss Susan White, Boston.
1889 Hargraves, William J., Jamaica Plain.
1887 Harris, Thaddeus William, A. M., Littleton, N. H.
1910 Harris, Prof. William Fenwick, Cambridge.
1909 Hart, Francis R., Milton.
1899 Hartshorn, Arthur E., Worcester.
1895 Harwood, George Fred, Newton
1884 Hastings, Levi W., Brookline.
1906 Hauthaway, Edwin D., Sharon.
1891 Hawken, Mrs. Thomas, Rockland, Me.
1899 Hayward, George P., Chestnut Hill.
1905 Head, Thomas W., Bergenfield, N. J.
1903 Hellier, Charles E., Boston.
1888 Hemenway, Augustus, Canton.
1899 Hemenway, Mrs. Augustus, Canton.
1884 Henshaw, Joseph P. B., Boston.
1899 Henshaw, Samuel, Cambridge.
1901 Heurlin, Julius, South Braintree.
1894 Hewett, Miss Mary C., Canton.
1900 Higginson, Francis L., Boston.
1902 Higginson, Mrs. Henry L., Boston.
1866 Hilbourn, A. J., Boston.
1886 Hittinger, Jacob, Belmont.
1911 Hittinger, Richard, Belmont.
1895 Hoitt, Hon. Charles W., Nashua, N. H.
1905 Holbrook, E. Everett, Boston.
1899 Hollingsworth, Z. T., Boston.
1881 Hollis, George W., Allston.
1891 Holmes, Edward J., Boston.
1876 Holt, Mrs. Stephen A., Cambridge.
1900 Holt, William W., Norway, Maine.
1899 Hood, The Hon. Mrs. Horace L. A., London, Eng.
1899 Hooper, William, Manchester.
1888 Horsford, Miss Kate, Cambridge.
1912 Horton, Arthur E., Lexington.

1902 Hosmer, Oscar, Wenham.
1907 Houghton, Clement S., Chestnut Hill.
1910 Houghton, Miss Elizabeth G., Boston.
1872 Hovey, Charles H., South Pasadena, Cal.
1884 Hovey, Stillman S., Woburn.
1904 Howard, Henry M., West Newton.
1896 Howard, Joseph W., Somerville.
1905 Hoyt, William J., Manchester. N. H.
1896 Hubbard, Charles Wells, Weston.
1865 Hubbard, James C., Everett.
1875 Humphrey, George W., Dedham.
1912 Hunnewell, F. W., 2d., Wellesley.
1893 Hunnewell, Henry Sargent, Wellesley.
1912 Hunnewell, Mrs. Henry S., Wellesley.
1882 Hunnewell, Walter, Wellesley.
1912 Hunnewell, Walter, Jr., Wellesley.
1892 Hunt, Dudley F., Reading.
1866 Hunt, Franklin, Charlestown, N. H.
1880 Hunt, William H., Concord.
1904 Hutchins, Rev. Charles Lewis, Concord.

1893 Jack, John George, Jamaica Plain.
1886 Jackson, Charles L., Boston.
1884 Jackson, Robert T., Cambridge.
1902 James, Ellerton, Milton.
1902 James, Mrs. Ellerton, Milton.
1899 James, George Abbot, Nahant.
1910 Jaques, Herbert, Chestnut Hill.
1899 Jeffries, William A., Boston.
1865 Jenks, Charles W., Bedford.
1905 Johnson, Arthur S., Boston.
1885 Johnson, J. Frank, Malden.
1907 Jones, Mrs. Clarence W., Brookline.
1896 Jones, Jerome, Brookline.
1897 Jones, Dr. Mary E., Boston.
1899 Jordan, Eben D., Boston.
1900 Jordan, Henry G., Brookline.
1888 Jose, Edwin H., Cambridgeport.

1897 Kellen, William V., Marion.
1886 Kelly, George B., Jamaica Plain.
1848 Kendall, D. S., Woodstock, Ont.
1868 Kendall, Edward, Cambridgeport.
1891 Kendall, Dr. Walter G., Atlantic.
1868 Kennedy, George G., M. D., Milton.
1909 Kennedy, Harris, M. D., Milton.
1905 Keyes, Mrs. Emma Mayer, Boston.
1891 Keyes, John M., Concord.
1889 Kidder, Charles A., Southborough.
1910 Kidder, Mrs. Henry P., Boston.
1880 Kidder, Nathaniel T., Milton.
1899 Kimball, David P., Boston.
1903 Kimball, Richard D., Waban.
1899 King, D. Webster, Boston.
1865 Kingman, Abner A., Wakefield.
1899 Kinney, H. R., Worcester.
1906 Kinnicutt, Mrs. Leonard P., Worcester.
1904 Kirkland, Archie Howard, Reading.

1899 Lamb, Horatio A., Milton.
1865 Lancaster, Charles B., Boston.
1905 Lane, Gardiner M., Boston.
1899 Lanier, Charles, Lenox.
1895 Lawrence, Amos A., New York, N. Y.
1876 Lawrence, James, Groton.
1873 Lawrence, John, Groton.

1899 Lawrence, Rt. Rev. William, Boston.
1895 Lee, Daniel D., Jamaica Plain.
1875 Lee, Francis H., Salem.
1880 Leeson, Hon. Joseph R., Newton Centre.
1902 Leighton, George B., Monadnock, N. H.
1871 Lemme, Frederick, Charlestown.
1903 Libby, Charles W., Medford.
1904 Lindsey, N. Allen, Marblehead.
1887 Little, James L., Brookline.
1899 Little, John Mason, Swampscott.
1899 Locke, Isaac H., Belmont.
1891 Lodge, Richard W., Boston.
1897 Loomis, Elihu G., Bedford.
1899 Loring, Augustus P., Beverly.
1905 Loring, David, Boston.
1899 Loring, Mrs. William Caleb, Beverly.
1899 Lowell, Abbott Lawrence, Boston.
1902 Lowell, Miss Amy, Brookline.
1903 Lowell, James A., Chestnut Hill.
1903 Lowell, John, Newton.
1904 Lowell, Miss Lucy, Boston.
1899 Luke, Otis H., Brookline.
1895 Lunt, William W., Hingham.
1895 Lyman, George H., Wareham.

1898 Mabbett, George, Plymouth.
1912 McKay, Alexander, Jamaica Plain.
1911 McKenzie, Donald, Chestnut Hill.
1900 Mackie, George, M. D., Attleboro.
1886 McWilliam, George, Whitinsville.
1868 Mahoney, John, Boston.
1892 Mallett, E. B., Jr. Freeport, Me.
1884 Manda, W. A., South Orange, N. J.
1906 Mandell, Mrs. William D., Boston.
1873 Mann, James F., Ipswich.
1887 Manning, J. Woodward, North Wilmington.
1884 Manning, Warren H., Brookline.
1903 Marble, Benjamin C., Manchester.
1909 Marlborough, James, Topsfield.
1876 Marshall, Frederick F., Everett.
1898 Marston, Howard, Brookline.
1899 Mason, Miss Ellen F., Boston.
1896 Mason, Col. Frederick, Taunton.
1901 Matthews, Nathan, Boston.
1906 Maxwell, George H., Newton.
1902 Melvin, George, South Framingham.
1885 Melvin, James C., Boston.
1905 Meredith, J. Morris, Topsfield.
1907 Merriam, Charles, Weston.
1881 Merriam, Herbert, Weston.
1908 Merry, Louis E., West Somerville.
1884 Metivier, James, Waltham.
1888 Milmore, Mrs. Joseph, Washington, D. C.
1899 Minot, Charles S., Milton.
1908 Minot, Laurence, Boston.
1896 Mitton, Edward J., Brookline.
1892 Monteith, David, Hyde Park, Vt.
1896 Montgomery, Alexander, Natick.
1902 Montgomery, Alexander, Jr., Natick.
1896 Moore, George D., Arlington.
1881 Moore, John H., Concord.
1897 Morgan, George H., New York, N. Y.
1912 Morris, George E., Waltham.
1899 Morse, John T., Boston.
1909 Morse, John Torrey, 3d., Boston.

1910 Morse, Lewis Kennedy, Boxford.
1900 Morse, Robert M., Jamaica Plain.
1902 Morton, James H., Mattapan.
1896 Moseley, Charles H., Roxbury.
1909 Moseley, Charles W., Newburyport.
1896 Moseley, Frederick Strong, Newburyport.
1859 Mudge, George A., Portsmouth, N. H.
1900 Murray, Peter, Fairhaven.
1897 Mutch, John, Waban.

1899 Nevins, Mrs. David, Methuen.
1874 Newman, John R., Winchester.
1874 Newton, Rev. William W., Pittsfield.
1906 Nickerson, William E., Cambridge.
1881 Norton, Charles W., Allston.
1891 Norton, Edward E., Boston.
1869 Norton, Patrick, Dorchester.

1912 O'Conner, John, Brookline.
1898 Olmsted, Frederick Law, Jr., Brookline.
1892 Olmsted, John C., Brookline.
1898 Orpet, Edward O., Lake Forest, Ill.

1909 Page, George, Newton Highlands.
1909 Page, George William, East Billerica.
1900 Page, Mrs. Henrietta, Cambridge.
1884 Paige, Clifton H. Mattapan.
1908 Parker, Augustine H., Dover.
1891 Parker, Charles W., Boston.
1911 Parker, Edward, North Easton.
1899 Parkman, Henry, Boston.
1899 Parsons, John E., Lenox.
1897 Patten, Marcellus A., Tewksbury.
1909 Peabody, Francis, Milton.
1909 Peabody, Mrs. Francis, Milton.
1905 Peabody, Frank E., Boston.
1899 Peabody, George A., Danvers.
1881 Peabody, John E., Salem.
1871 Peck, William G., Arlington.
1907 Peirce, E. Allan, Waltham.
1899 Pentecost, Mrs. Ernest Harvey, Topsfield.
1873 Perry, George W., Malden.
1904 Perry, Oliver Hazard, Lowell.
1899 Pfaff, Col. Charles, South Framingham.
1900 Phillips, John C., North Beverly.
1899 Phillips, Mrs. John C., North Beverly.
1899 Phillips, William, North Beverly.
1895 Pickman, Dudley L., Boston.
1902 Pickman, Mrs. Ellen R., Boston.
1881 Pierce, Dean, Brookline.
1892 Pierce, George Francis, Neponset.
1905 Pierce, Wallace L., Boston.
1905 Pierson, Frank R., Tarrytown, N. Y.
1900 Pond, Preston, Winchester.
1899 Porter, Alexander S., Boston.
1892 Porter, James C., Wollaston.
1884 Pratt, Laban, Dorchester.
1868 Pratt, Robert M., Boston.
1898 Pray, James Sturgis, Cambridge.
1858 Prescott, Eben C., New York, N. Y.
1903 Presson, Alfred, Gloucester.
1903 Preston, Howard Willis, Providence, R. I.
1911 Priest, Lyman F., Gleasondale.
1912 Proctor, Henry H., Boston.
1901 Proctor, Thomas E., Boston.
1899 Putnam, George, Manchester.
1900 Putnam, George J., Brookline.

1886 Quinby, Hosea M., M. D., Worcester.

1891 Raddin, Everett W., North Cambridge.
1889 Rand, Harry S., North Cambridge.
1908 Rand, Miss Margaret A., Cambridge.
1903 Rawson, Herbert W., Arlington.
1882 Ray, James F., Franklin.
1890 Raymond, Walter, Pasadena, Cal.
1891 Read, Charles A., Manchester.
1902 Reardon, Edmund, Cambridgeport.
1892 Reardon, John B., Boston.
1912 Reiff, William, Forest Hills.
1905 Remick, Frank W., West Newton.
1889 Rice, George C., Worcester.
1887 Rich, William P., Chelsea.
1876 Richards, John J., Brookline.
1899 Richardson, Mrs. F. L. W., Brookline.
1912 Richardson, H. H., Brookline.
1900 Richardson, Dr. William L., Boston.
1905 Riggs, William Allan, Auburndale.
1886 Ripley, Charles, Dorchester.
1892 Ripley, Ebed L., Hingham Centre.
1903 Robb, Russell, Concord.
1909 Roberts, Miss Anna B., Boston.
1909 Robinson, Alfred E., Lexington.
1871 Robinson, John, Salem.
1885 Robinson, Joseph B., Dorchester.
1900 Rodman, Miss Mary, Concord.
1903 Roffe, Albert H., Newton Centre.
1911 Rogers, Dexter M., Allston.
1899 Rogers, Mrs. Jacob C., Peabody.
1900 Roland, Thomas, Nahant.
1910 Ross, Harold S., Hingham.
1895 Rothwell, James E., Brookline.
1899 Roy, David Frank, Marion.
1881 Ruddick, William H., M. D., South Boston.
1875 Russell, George, Woburn.
1900 Russell, James S., Milton.

1893 Salisbury, William C. G., Brookline.
1912 Saltonstall, John L., Beverly.
1912 Saltonstall, Mrs. John L., Beverly.
1899 Saltonstall, Richard M., Chestnut Hill.
1898 Sanger, Mrs. George P., Boston.
1900 Sargent, Andrew Robeson, Brookline.
1870 Sargent, Charles S., Brookline.
1899 Sargent, Mrs. Charles S., Brookline.
1902 Sargent, Charles Sprague, Jr., Brookline.
1899 Sargent, Mrs. Francis W., Wellesley.
1896 Scorgie, James C., Cambridge.
1864 Scott, Charles, Newton.
1895 Sears, Miss Clara E., Boston.
1899 Sears, Dr. Henry F., Boston.
1899 Sears, Mrs. J. Montgomery, Boston.
1898 Sharp, Miss Helen, Boston.
1859 Shaw, Christopher C., Milford, N. H.
1899 Shaw, Francis, Wayland.
1899 Shaw, Mrs. Robert G., Wellesley.
1901 Shea, James B., Jamaica Plain.
1906 Sherman, J. P. R., Newton.
1865 Shorey, John L., Lynn.
1892 Shuman, Hon. A., Roxbury.
1901 Shurtleff, Josiah B., Jr., Revere.
1899 Sias, Charles D., Wenham.
1893 Siebrecht, H. A., New Rochelle, N. Y.
1899 Skinner, Francis, Dedham.
1899 Sleeper, Henry Davis, Boston.

1903 Smiley, Daniel, Lake Mohonk, N. Y.
1888 Smith, Charles S., Lincoln.
1872 Smith, Edward N., San Francisco, Cal.
1911 Smith, John L., Swampscott.
1888 Smith, Thomas Page, Waltham.
1874 Snow, Eugene A., Boston.
1899 Sohier, Col. William D., Beverly.
1864 Spaulding, Edward, Weston.
1908 Spaulding, John T., Prides Crossing.
1908 Spaulding, William S., Prides Crossing.
1897 Sprague, Isaac, Wellesley Hills.
1884 Stearns, Charles H., Brookline.
1893 Stearns, Frank W., Newton.
1896 Stedman, Henry R., M. D., Brookline.
1885 Stewart, William J., Winchester.
1901 Stone, Charles A., Newton.
1889 Stone, Charles W., Boston.
1910 Stone, Mrs. Francis H., New Bedford.
1896 Stone, Prof. George E., Amherst.
1849 Stone, George F., Chestnut Hill.
1905 Storrow, James J., Boston.
1905 Stratton, Charles E., Boston.
1848 Strong, William C., Waban.
1906 Strout, Charles S., Biddeford, Me.
1902 Sturgis, Richard Clipston, Boston.
1910 Sullivan, Martin, Brookline.
1912 Swan, Charles H., Jamaica Plain.
1891 Sweet, Everell F., Malden.
1904 Sylvester, Edmund Q., Hanover.

1899 Taylor, Charles H., Boston.
1896 Tenney, Charles H., Methuen.
1912 Thatcher, Arthur E., Bar Harbor, Me.
1898 Thatcher, William, Brookline.
1899 Thayer, Mrs. Alice R., Boston.
1900 Thayer, Bayard, South Lancaster.
1900 Thayer, Mrs. Bayard, South Lancaster.
1899 Thayer, Mrs. Eugene V. R., South Lancaster.
1903 Thayer, Henry J., Boston.
1899 Thayer, John E., South Lancaster.
1899 Thayer, Mrs. John E., South Lancaster.
1899 Thayer, Mrs. Nathaniel, Lancaster.
1899 Thiemann, Hermann, Owosso, Mich.
1899 Thomas, W. B., Manchester.
1910 Thurlow, George C., West Newbury.
1874 Tolman, Miss Harriet S., Boston.
1896 Toppan, Roland W., Malden.
1904 Torrey, Elbridge, Dorchester.
1864 Torrey, Everett, Charlestown.
1899 Tower, Miss Ellen May, Lexington.
1901 Tower, Mrs. Helen M., Cambridge.
1891 Travis, Charles B., Brighton.
1893 Trepess, Samuel J., Glencove, L. I., N. Y.
1910 Turner, Chester Bidwell, Roxbury.

1910 Underwood, Henry O., Belmont.
1901 Underwood, Loring, Belmont.

1873 Vander-Woerd, Charles, Waltham.
1899 Vaughan, William Warren, Boston.
1884 Vinal, Miss Mary L., Somerville.

1909 Wainwright, Arthur, Milton.
1849 Wakefield, E. H., Cambridge.

1876 Walcott, Henry P., M. D., Cambridge.
1895 Waldo, C. Sidney, Jamaica Plain.
1880 Wales, George O., Braintree.
1896 Walsh, Michael H., Woods Hole.
1901 Waltham, George C., Dorchester.
1907 Walton, Arthur G., Wakefield.
1902 Warburton, Chatterton, Fall River.
1912 Wardwell, Mrs. T. Otis, Haverhill.
1894 Ware, Miss Mary L., Boston.
1909 Warren, Bentley W., Boston.
1889 Watson, Benjamin M., Jamaica Plain.
1884 Watson, Thomas A., East Braintree.
1905 Webster, Edwin S., Chestnut Hill.
1905 Webster, Frank G., Boston.
1907 Webster, George H., Haverhill.
1896 Webster, Hollis, Cambridge.
1905 Webster, Laurence J., Holderness, N. H.
1909 Weeks, Andrew Gray, Marion.
1901 Welch, David, Dorchester.
1902 Welch, Edward J., Dorchester.
1884 Weld, Christopher Minot, Readville.
1899 Weld, Gen. Stephen M., Wareham.
1912 Wellington, Mrs. Arthur W., Boston.
1882 West, Mrs. Maria L., Neponset.
1887 Wheeler, Frank, Concord.
1889 Wheeler, James, Natick.
1897 Wheeler, Wilfrid, Concord.
1865 Whitcomb, William B., Medford.
1901 White, Mrs. Charles T., Boston.
1865 White, Francis A., Brookline.
1899 White, George R., Boston.
1909 White, Harry K., Milton.
1888 White, Joseph H., Brookline.
1905 Whitman, William, Brookline.
1894 Whitney, Arthur E., Winchester.
1894 Whitney, Ellerton P., Milton.
1899 Whitney, Henry M., Cohasset.
1896 Whittier, George E., Groton.
1899 Wigglesworth, George, Milton.
1863 Wilbur, George B., Boston.
1889 Wilde, Mrs. Albion D., West Roxbury.
1881 Wilder, Edward Baker, Dorchester.
1899 Williams, Miss Adelia Coffin, Roxbury.
1905 Williams, George Percy, Boston.
1899 Williams, John Davis, Boston.
1905 Williams, Mrs. J. Bertram, Cambridge.
1905 Williams, Mrs. Moses, Brookline.
1871 Williams, Philander, Taunton.
1911 Williams, Ralph B., Dover.
1881 Wilson, William Power, Boston.
1905 Winsor, Robert, Weston.
1906 Winter, Herman L., Seabrook, N. H.
1870 Wood, William K., Franklin.
1905 Woodberry, Miss E. Gertrude, North Cambridge.
1905 Woodbury, John, Canton.
1906 Woodward, Mrs. Samuel Bayard, Worcester.
1900 Wyman, Windsor H., North Abington.

ANNUAL MEMBERS.

1905 Allen, Mrs. Sallie R., Wilmington.
1896 Anderson, George M., Milton.

1912 Babcock, Miss Mabel Keyes, Wellesley Hills.
1911 Bacon, Augustus, Roxbury.
1865 Barker, John G., South Bend, Ind.
1898 Barr, John, South Natick.
1907 Bennett, John W., Springfield, Vt.
1893 Bigelow, Mrs. Nancy J., Southborough.
1867 Bird, John L., Dorchester.
1902 Blackmur, Paul R., Quincy.
1909 Blanchard, Herbert W., Concord.
1905 Bolton, Sabin, Hingham.
1904 Borst, Theodore F., South Framingham.
1901 Bradley, Miss Abby A., Hingham.
1873 Breck, Charles H., Newton.
1902 Breed, Edward W., Clinton.
1908 Briggs, Frank P., Ayer.
1909 Brigham, Mrs. Clifford, Milton.
1908 Butler, E. K., Jamaica Plain.

1910 Camus, Emil, Boston.
1904 Chandler, Alfred D., Brookline.
1878 Chase, Joseph S., Malden.
1903 Child, Stephen, Boston.
1890 Chubbuck, Isaac Y., Roxbury.
1910 Churchill, Charles E., Rockland.
1912 Clark, Mrs. Herbert L., Reading.
1865 Clark, Joseph, Manchester.
1882 Collins, Frank S., Malden.
1907 Colt, Mrs. J. D., Chestnut Hill.
1881 Crosby, J. Allen, Jamaica Plain.
1875 Curtis, Joseph H., Boston.
1912 Cutler, Mrs. N. P., Newton.
1906 Cutting, Mrs. Isabelle Ladd, Roxbury.

1910 Dahl, Frederick William, Roxbury.
1889 Davis, Frederick S., West Roxbury.
1911 Dolansky, Frank J., Lynn.
1897 Dorr, George B., Boston.
1884 Doyle, William E., Cambridge.

1903 Evans, Frank H., Malden.

1902 Farlow, Mrs. William G., Cambridge.
1901 Fiske, Harry E., Wollaston.
1894 Fitzgerald, Desmond, Brookline.
1885 Forbes, William H., Jamaica Plain.
1903 Freeman, Miss Harriet E., Boston.
1905 Fuld, Maurice, Philadelphia, Pa.

1912 Gage, L. Merton, Groton.
1904 Gardiner, John Hays, Longwood.
1902 Garthly, James, Fairhaven.
1912 Goodwin, Mrs. Daniel, East Greenwich, R. I.
1900 Grey, Robert Melrose, Belmont, Cuba.

1897 Grey, Thomas J., Chelsea.

1907 Hall, Harry F., Camden, N. J.
1908 Hamilton, Mrs. George Langford, Magnolia.
1910 Handley, A. H., Newton.
1912 Hardy, John H., Jr., Littleton.
1898 Harrison, C. S., York, Nebraska.
1912 Hartshorn, Wm. N., Boston.
1894 Hatfield, T. D., Wellesley.
1910 Hayward, Mrs. W. E., Ipswich.
1891 Heustis, Warren H., Belmont.
1902 Hildreth, Miss Ella F., Westford..
1902 Hill, Arthur Dehon, Boston.
1884 Hill, J. Willard, Belmont.
1912 Hollingsworth, Mrs. Sumner, Boston.
1900 Howden, Thomas, Plymouth.
1902 Hubbard, Allen, Newton Centre.
1893 Hubbard, F. Tracy, Cambridge.

1901 Illenberger, Henry W., Greenwich, Conn.

1893 James, Robert Kent, Newton Centre.
1869 Jameson, G. W., East Lexington.
1903 Johnston, Robert, Lexington.

1894 Keith, Mrs. Mary R., Washington, D. C.
1898 Kelsey, Harlan P., Salem.
1898 Kennard, Frederic H., Newton Centre.
1912 Kirkegaard, John, Bedford.

1889 Lancaster, Mrs. E. M., Roxbury.
1900 Lawson, Joshua, Brookline.
1904 Leuthy, A., Roslindale.
1902 Lewis, E. L., Taunton.
1896 Lincoln, Miss Agnes W., Medford.
1908 Lockwood, R. Wilton, South Orleans.
1901 Loring, Mrs. Thacher, Boston.
1896 Loring, William C., Beverly.
1865 Lothrop, Thornton K., Boston.
1903 Lumsden, David, Durham, N. H.

1912 McCarthy, Nicholas F., South Boston.
1904 MacMulkin, Edward, Boston.
1890 Manning, A. Chandler, Reading.
1910 Morrison, John G., Cambridge.

1892 Newton, John F., Roxbury.
1895 Nicholson, William, Framingham.
1904 Nicol, James, Quincy.
1903 Nixon, J. Arthur, Taunton.

1906 Parker, Eliab, Roxbury.
1892 Parker, Walter S., Reading.
1909 Parker, W. Prentiss, Roxbury.
1908 Peabody, Mrs. W. Rodman, Cambridge.
1898 Pierce, Mrs. F. A., Brookline.
1902 Pritchard, John, Auburn, R. I.
1912 Proctor, Dr. Francis I., Wellesley.
1883 Purdie, George A., Wellesley Hills.

1906 Rane, Prof. F. W., Waban.
1897 Rea, Frederic J., Norwood.
1912 Reed, H. B., South Weymouth.
1893 Rich, Miss Ruth G., Dorchester.
1888 Rich, William E. C., Roxbury.
1900 Robb, Peter B., Whitinsville.
1893 Robinson, Walter A., Arlington.
1879 Ross, Charles W., Newtonville.
1892 Ross, Henry Wilson, Newtonville.
1903 Ross, Walter D., Worcester.
1909 Russell, Charles F., Weston.
1910 Rust, William C., Brookline.

1907 Sanborn, Edward W., Boston.

1897 Sander, Charles, Brookline.
1875 Saunders, Miss Mary T., Salem.
1871 Scott, Augustus E., Lexington.
1896 Searles, E. F., Methuen.
1910 Sears, Prof. F. C., Amherst.
1907 Seaver, Robert, Jamaica Plain.
1904 Sharkey, John F., Cambridge.
1886 Sharples, Stephen P., Cambridge.
1907 Sim, William, Cliftondale.
1910 Smith, D. Roy, Boston.
1904 Symmes, Samuel S., Winchester.

1869 Tailby, Joseph, Wellesley.
1904 Thorpe, Joseph, Taunton.
1909 Tracy, B. Hammond, Wenham.
1907 Turner, Everett P., Arlington.
1892 Tyndale, Theodore H., Boston.

1911 Ufford, Charles A., Dorchester.
1911 Unverhau, Heinrich, Marblehead.

1881 Vaughan, J. C., Chicago, Ill.

1902 Ware, Horace E., Milton.
1891 Warren, Samuel H., Weston.
1903 Waugh, Prof. F. A., Amherst.
1889 Welch, Patrick, Dorchester.
1893 Westwood, Thomas H., Jamaica Plain.
1909 Wheeler, George F., Concord.
1897 Wheeler, Henry A., Newtonville.
1902 Wheelwright, George William, Jamaica Plain.
1907 Whipple, Frank L., Lynn.
1905 White, Miss Margaret, Cambridge.
1910 Whitwell, Miss Natalie S., Boston.
1901 Wilder, Miss Grace S., Dorchester.
1897 Wilkie, Edward A., Newtonville.
1889 Winter, William C., Mansfield.

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TRANSACTIONS

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FOR THE YEAR 1913

PART I

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